Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 11, 2023

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for ATT**
Crown #842862; ATT Site ID CTL05048
259 Commerce Street, East Haven, CT 06512
Latitude: 41° 15′ 22.88″ / Longitude: -72° 52′ 32.80″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 55-foot level of the existing 58-foot monopole tower at 259 Commerce Street, East Haven, CT. The tower is owned by Crown Castle USA Inc. and the property is owned by Stephen J. Viglione. AT&T now intends to replace six (6) antennas, install nine (9) new antennas and ancillary equipment at the 55-foot level. This modification may include B2, B5, B17, B14, B29, B30, B66 & n77 hardware that is 4G(LTE) and/or 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

Panned Modification:

Tower:

Installed New:

(6) Ericsson-AIR6449 B77D + AIR6419 B77G Stacked Antennas w/integrated RRH
(3) CCI-TPA65R-BU6DA-K Antennas
(3) Ericsson-4478 B14 RRH
(3) Back to Back Mounts
(2) VALMONT-PM1 Stand Offs
Install new mount per MRA
(6) Y CABLES

Remove:

(3) QUINTEL-QS66512-6 Antennas
(3) KATHREIN-800-10121 Antennas
(6) POWERWAVE TECH-LGP21401 TMA

Ground:

Install New:

(6) Rectifiers
(2) 170AH Battery Strings
(1) Battery Cabinet
(1) 6648 with XCEDE Cable

Remove:

(2) 150AH Battery Strings
(6) LGP 21901 Diplexers
(1) UMTS Cabinet
(1) 6601
(1) XMU

The facility was approved by the Siting Council in Petition Number 634 on July 8, 2003. No conditions were attached that would be impacted by this modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Honorable Joseph A. Carfora, Mayor of the Town of East Haven, Joseph Budrow, Zoning Enforcement Officer for the municipality, Stephen J. Viglione, the property owner and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, ATT respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Domenica Tatasciore.

Sincerely,

Domenica Tatasciore
Site Acquisition Specialist
1800 W. Park Drive
Westborough, MA 01581
(508) 621-9161/ Domenica.Tatasciore@crowncastle.com

Attachments
cc:

The Honorable Joseph A. Carfora, Mayor
Town of East Haven
250 Main Street
East Haven, CT 06512
(203) 468-3204

Joseph Budrow, Zoning Enforcement Officer
Town of East Haven
250 Main Street
East Haven, CT 06512
(203) 468-3349

Stephen J. Viglione
259 Commerce Street
East Haven, CT 06512
203-467-8388

Crown Castle, Tower Owner

From: TrackingUpdates@fedex.com
To: Tatasciore, Domenica
Subject: FedEx Shipment 770962616622: Your package has been delivered
Date: Thursday, January 12, 2023 10:21:33 AM

Hi. Your package was delivered Thu, 01/12/2023 at 10:05am.

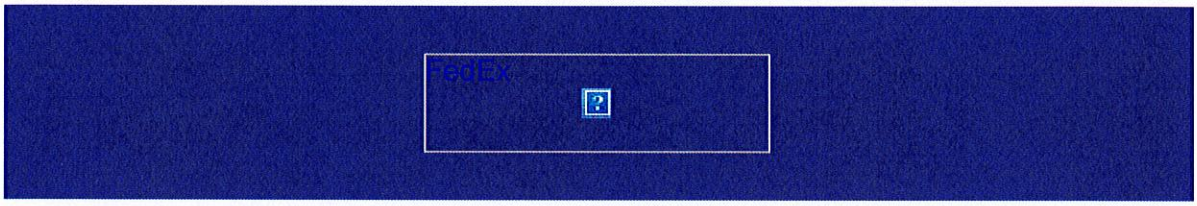
Delivered to 250 MAIN ST, EAST HAVEN, CT 06512
Received by R.RENEE

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	770962616622
FROM	Domenica Tatasciore 1800 West Park Drive

	Suite 200 WESTBOROUGH, MA, US, 01581
TO	Town of East Haven Honorable Joseph A. Carfora, Mayor 250 Main Street EAST HAVEN, CT, US, 06512
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Wed 1/11/2023 08:32 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	EAST HAVEN, CT, US, 06512
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	0.50 LB
SERVICE TYPE	FedEx Priority Overnight

From: TrackingUpdates@fedex.com
To: Tatasciore, Domenica
Subject: FedEx Shipment 770962638123: Your package has been delivered
Date: Thursday, January 12, 2023 10:16:30 AM



Hi. Your package was delivered Thu, 01/12/2023 at 10:05am.

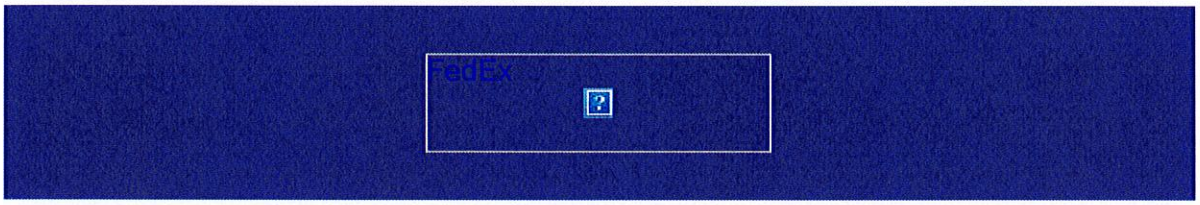
Delivered to 250 MAIN ST, EAST HAVEN, CT 06512
Received by R.RENEE

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	770962638123
FROM	Domenica Tatasciore 1800 West Park Drive

	Suite 200 WESTBOROUGH, MA, US, 01581
TO	Town of East Haven Joseph Budrow, Zoning Enforcement 250 Main Street EAST HAVEN, CT, US, 06512
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Wed 1/11/2023 08:32 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	EAST HAVEN, CT, US, 06512
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	0.50 LB
SERVICE TYPE	FedEx Priority Overnight

From: TrackingUpdates@fedex.com
To: Tatasciore, Domenica
Subject: FedEx Shipment 770962654391: Your package has been delivered
Date: Thursday, January 12, 2023 10:09:13 AM



Hi. Your package was delivered Thu, 01/12/2023 at 10:01am.

Delivered to 259 COMMERCE ST, EAST HAVEN, CT 06512
Received by V.VIG

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 770962654391

FROM Domenica Tatasciore
1800 West Park Drive

	Suite 200 WESTBOROUGH, MA, US, 01581
TO	Stephen J. Viglione 259 Commerce Street EAST HAVEN, CT, US, 06512
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Wed 1/11/2023 05:26 PM
DELIVERED TO	Shipping/Receiving
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	EAST HAVEN, CT, US, 06512
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Petition No. 634
AT&T Wireless
East Haven, Connecticut
Staff Report
July 8, 2003

On June 10, 2003, Connecticut Siting Council (Council) member Philip T. Ashton and S. Derek Phelps of staff met with AT&T Wireless representatives at 259 Commerce Street in East Haven. Other persons in attendance were Lucia Chiocchio, Esq., of Cuddy & Feder LLP; Doug Frost, Engineering Technician, of NATCOMM, LLC; Kumar Rughoobur, RF Engineer, of WFI; Ray Vergati, Project Director, of Optasite, Inc.; and George Mingione, Planning and Zoning Administrator of the Town of East Haven. AT&T Wireless proposes to replace and expand an existing lattice tower and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

Specifically, AT&T Wireless proposes to replace and expand an existing 48' lattice tower (with a whip antenna extending to 61') with a 57' monopole to be relocated approximately 8' to 10' from the location of the existing tower. AT&T would attach six panel antennas on T-arms to the replacement tower. The property owner's whip antenna would not be reinstalled.

The existing lattice tower is located adjacent to the west side of the existing tower. The replacement monopole is 9' taller than the existing tower, but the overall height of the proposed facility will be approximately 1' lower in total height.

The proposed tower needs to be relocated approximately 8' to 10' from the location of the existing lattice tower for construction purposes. Associated equipment cabinets will be installed on a 7' x 13' concrete pad located at the base of the pole surrounded by an 8' vinyl stockade fence, which will be screened with 6' evergreen trees. The utilities will be installed underground.

At the request of the Council, AT&T Wireless wrote to six nearby residents on June 12, 2003, whose homes are within sight of the proposed tower location to advise them of the petition application. Those homeowners are: Antonio Rossano; Robert A. Esposito; Rita Compano; Phyllis Naqstri and Linda Lawson; Sebatiano and Maria DiBona; and Anne M. Fitzgerald. These persons were asked to forward comments to the Council by June 3, 2003. One resident, Rita Compano, sent a letter stating that she is not in favor of the petition primarily on the basis of concerns that it will adversely affect the property value of her home.

George Mingione, Planning and Zoning Administrator of the Town of East Haven, wrote to the Council in a letter dated June 11, 2003, stating that the town's preference is for vinyl fencing around the tower compound, not less than six feet tall, with evergreen plantings.

Town of East Haven, CT

Property Listing Report

Map Block Lot: 090 1013 005 | Building #: 1 | Unique Identifier: V0098600

Property Information

Property Location	259 COMMERCE ST
Mailing Address	259 COMMERCE ST EAST HAVEN CT 06512
Land Use	Light Industrial
Zoning Code	LI-2
Neighborhood	IS1

Owner	VIGLIONE STEPHEN J
Co-Owner	
Book / Page	0322/0838
Land Class	Industrial
Census Tract	1801000
Acreage	0.49

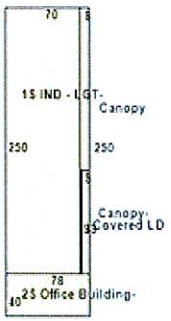
Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	806700	564690
Outbuildings	14200	9940
Land	114000	79800
Total	934900	654430

Utility Information

Electric	No
Gas	No
Sewer	Yes
Public Water	Yes
Well	No



Primary Construction Details

Year Built	1956
Building Desc.	Commercial
Building Style	
Stories	1
Exterior Walls	Concrete Block
Exterior Walls 2	B. V. Solid
Interior Walls	
Interior Walls 2	
Interior Floors 1	Tile
Interior Floors 2	

Heating Fuel	Gas
Heating Type	FHA
AC Type	Central
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	5
Total Rooms	0
Bath Style	NA
Kitchen Style	
Occupancy	0

Livable Area (ft)	23740
Building Use	Light Manu
Building Condition	Average
Frame Type	Average
Building Grade	0
Fireplaces	0
Wood Stoves	0
Attic Access	
Roof Style	
Roof Cover	

Bsmt Area	0
Fin Bsmt Area	0
Fin Bsmt Quality	
Bsmt Access	
Bsmt Gar	0
Bsmt Sump Pump	No

Report Created On 8/10/2022

Town of East Haven, CT

Property Listing Report | Map Block Lot 090 1013 005 | Building # 1 | Unique Identifier V0098600

Detached Outbuildings

Type	Description	Area (sq ft)	Condition	Year Built
Fencing	Fencing	400	Average	1956
Paving	Paving	12000	Average	1956

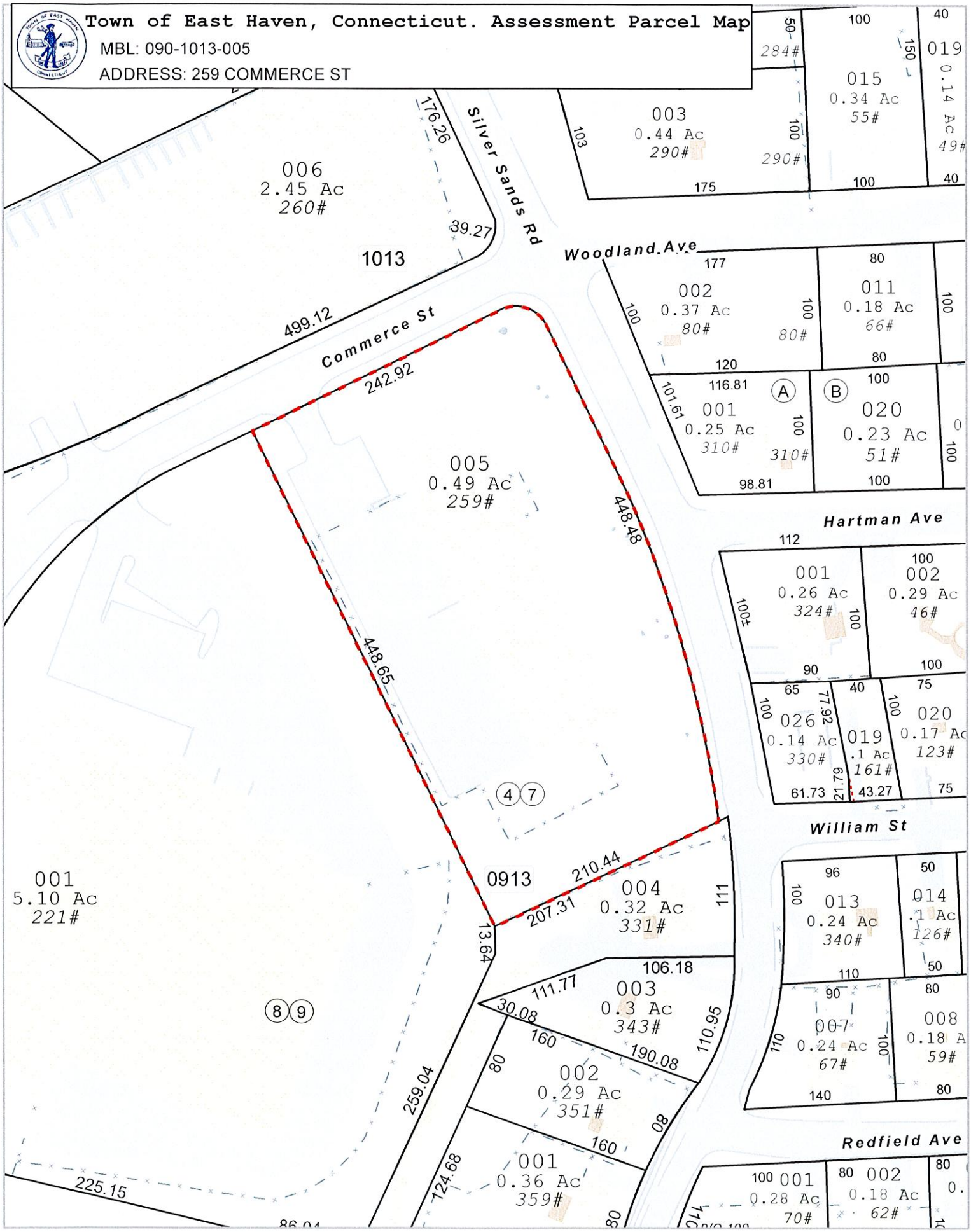
Attached Extra Features

Type	Description	Area (sq ft)	Condition	Year Built
Loading Dock	Covered Loading Dock	783	Average	1984
Canopy	Canopy	2078	Average	1984

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
VIGLIONE STEPHEN J	322_ 838	3/19/1981	0

Report Created On 8/10/2022



Disclaimer:
This map is for informational purposes only All information is subject to verification by any user. The Town of East Haven and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced: 07/2022

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Site Name:	EAST HAVEN SOUTH
Crown Castle Site#:	842862
Site ID:	CTL05048
Project Name:	5G NR 1SR C-BAND
Address:	259 COMMERCE STREET, EAST HAVEN, CT 06512
County:	NEW HAVEN
Latitude:	41.2563919
Longitude:	-72.8757989
Structure Type:	MONOPOLE
Property Owner:	CROWN CASTLE USA INC
Property Contact:	VERONICA CHAPMAN

AT&T Existing Facility

Report Information

Report Writer: Praveen Pavuluri **Report Generated Date:** 11-08-2022

Site Compliance Statement

Compliance Status	Compliant
Cumulative General Population % MPE (Ground Level)	12.8206%

November 08, 2022

Emissions Analysis for Site: **CTL05048 – EAST HAVEN SOUTH**

MobileComm Professionals, Inc was directed to analyze the proposed AT&T facility located at **259 COMMERCE STREET, EAST HAVEN, CT 06512**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of milliwatts per square centimeter (mW/cm^2) or microwatts per square centimeter (µW/cm2). The number of mW/cm^2 or µW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the 700 and 850 MHz Bands are approximately 0.467 mW/cm^2 and 0.567 mW/cm^2 respectively or 466.667 µW/cm2 and 566.667 µW/cm2 respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS), 2300 MHz (WCS), 3540 MHz (DoD Band) and 3840 MHz (C-Band) bands is 1 mW/cm^2 or 1000 µW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

1. Theoretical Calculations: Methods and Procedures

MobileComm Professionals, Inc has performed theoretical modeling of the site using a software tool, RoofMaster® Version 35.5.26.2022, which incorporates calculation methodologies detailed in FCC OET 65. RoofMaster® uses a cylindrical model for conservative power density predictions within the near field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations, the power decreases inversely with the square of the distance. The modeling is based on worst-case assumptions in terms of transmitter power and duty cycle. No losses were included in the power calculations unless they were specifically provided for the project.

In OET 65, a far field model is presented to calculate the spatial peak power density. The RoofMaster® implementation of this model incorporates antenna manufacturer's horizontal and vertical pattern data to determine the power density in all directions. This model yields the power density at a single point in space. In order to determine the spatial power density for comparison to the FCC limits, the average of several points calculated within the human profile (0-6') must be conducted. RoofMaster® calculates seven power density values between 0-6' above the specified study plane and performs a linear spatial average.

The following table details the antennas and operating parameters for the AT&T antenna system as well as any other antenna systems at the site. This is based on antenna information provided by the client and data compiled from other sources where necessary. The data below was input into Roofmaster® to perform the theoretical exposure calculations at the ground.

The theoretical calculations performed in Roofmaster® determine the cumulative exposure at all sample points at ground level (0-6' spatial average). The results from highest cumulative sample point at ground level surrounding the site are displayed in the table below. The contribution from directional antennas to the maximum cumulative totals varies greatly depending on location; therefore, the contribution from one antenna sector at the highest calculated exposure point may be greater or less than other sectors since sectorized directional antennas are pointed in different directions and there is not much overlapping exposure.

The contribution to the cumulative power density and % MPE for each antenna/frequency band is listed in the table. The cumulative power density and cumulative % MPE are displayed at the bottom of the table.

2. Antenna Inventory & Power Data

Sector	Ant ID	Operator	Antenna Mfg	Antenna Model	Antenna Type	FREQ. (MHz)	TECH.	AZ. (^{0})	HBW (^{0})	Antenna Gain (dBd)	Antenna Aperture (ft)	#of Channels	Transmitter Power (Watts)	Total ERP (Watts)	Total EIRP (Watts)	Calculated Power Density ($\mu W/cm^2$)	Allowable MPE ($\mu W/cm2$)	Calculated MPE%
A	1	AT&T	Kathrein	80010965	Panel	700	LTE(B14)	10	62	12.65	6.5	4	160.00	2945.24	4831.92	0.002482	466.67	0.000532
A	1	AT&T	Kathrein	80010965	Panel	2100	LTE/5G	10	62	16.15	6.5	4	160.00	6593.56	10817.33	0.002309	1000.00	0.000231
A	2-1	AT&T	Ericsson	AIR 6419 B77G	Panel	3450	5G	10	11	23.5	2.55	1	54.22	12138.53	19914.34	0.012057	1000.00	0.001206
A	2-2	AT&T	Ericsson	AIR 6449 B77D	Panel	3840	5G	10	11	23.5	2.55	1	86.75	19421.64	31862.94	0.024960	1000.00	0.002496
A	3	AT&T	CCI	TPA65R-BU6D	Panel	700	LTE(B12)	10	73	12.35	6	4	160.00	2748.65	4509.41	0.002030	466.67	0.000435
A	3	AT&T	CCI	TPA65R-BU6D	Panel	850	5G	10	63	12.95	6	4	160.00	3155.88	5177.50	0.001453	566.67	0.000256
A	3	AT&T	CCI	TPA65R-BU6D	Panel	1900	LTE/5G	10	66	15.95	6	4	160.00	6296.80	10330.47	0.001903	1000.00	0.000190
A	3	AT&T	CCI	TPA65R-BU6D	Panel	2300	LTE	10	60	15.85	6	4	100.00	3845.92	6309.57	0.001461	1000.00	0.000146
B	4	AT&T	Kathrein	80010965	Panel	700	LTE(B14)	120	62	12.65	6.5	4	160.00	2945.24	4831.92	0.000006	466.67	0.000001
B	4	AT&T	Kathrein	80010965	Panel	2100	LTE/5G	120	62	16.15	6.5	4	160.00	6593.56	10817.33	0.000003	1000.00	0.000000
B	5-1	AT&T	Ericsson	AIR 6419 B77G	Panel	3450	5G	120	11	23.5	2.55	1	54.22	12138.53	19914.34	0.000019	1000.00	0.000002
B	5-2	AT&T	Ericsson	AIR 6449 B77D	Panel	3840	5G	120	11	23.5	2.55	1	86.75	19421.64	31862.94	0.000046	1000.00	0.000005
B	6	AT&T	CCI	TPA65R-BU6D	Panel	700	LTE(B12)	120	73	12.35	6	4	160.00	2748.65	4509.41	0.000004	466.67	0.000001
B	6	AT&T	CCI	TPA65R-BU6D	Panel	850	5G	120	63	12.95	6	4	160.00	3155.88	5177.50	0.000004	566.67	0.000001
B	6	AT&T	CCI	TPA65R-BU6D	Panel	1900	LTE/5G	120	66	15.95	6	4	160.00	6296.80	10330.47	0.000001	1000.00	0.000000
B	6	AT&T	CCI	TPA65R-BU6D	Panel	2300	LTE	120	60	15.85	6	4	100.00	3845.92	6309.57	0.000005	1000.00	0.000000
C	7	AT&T	Kathrein	80010965	Panel	700	LTE(B14)	240	62	12.65	6.5	4	160.00	2945.24	4831.92	0.000346	466.67	0.000074
C	7	AT&T	Kathrein	80010965	Panel	2100	LTE/5G	240	62	16.15	6.5	4	160.00	6593.56	10817.33	0.000107	1000.00	0.000011
C	8-1	AT&T	Ericsson	AIR 6419 B77G	Panel	3450	5G	240	11	23.5	2.55	1	54.22	12138.53	19914.34	0.001624	1000.00	0.000162
C	8-2	AT&T	Ericsson	AIR 6449 B77D	Panel	3840	5G	240	11	23.5	2.55	1	86.75	19421.64	31862.94	0.004548	1000.00	0.000455
C	9	AT&T	CCI	TPA65R-BU6D	Panel	700	LTE(B12)	240	73	12.35	6	4	160.00	2748.65	4509.41	0.000384	466.67	0.000082
C	9	AT&T	CCI	TPA65R-BU6D	Panel	850	5G	240	63	12.95	6	4	160.00	3155.88	5177.50	0.000044	566.67	0.000008
C	9	AT&T	CCI	TPA65R-BU6D	Panel	1900	LTE/5G	240	66	15.95	6	4	160.00	6296.80	10330.47	0.000099	1000.00	0.000010
C	9	AT&T	CCI	TPA65R-BU6D	Panel	2300	LTE	240	60	15.85	6	4	100.00	3845.92	6309.57	0.000067	1000.00	0.000007

Table 2.1: Antenna Inventory & Power Data

**NOTE: 75% Duty Cycle and adjusted power reduction factor of 0.32 was applied to the AIR6449 & AIR6419 antennas per guidance from AT&T. Specifications were not available for the Ericsson AIR 6419 antenna. Per AT&T, specifications for the AIR 6449 antenna were used to model the 6419 due to its similarity.*

Sector	Ant ID	Operator	Antenna Mfg	Antenna Model	Antenna Type	FREQ. (MHz)	TECH.	AZ. (^{0})	HBW (^{0})	Antenna Gain (dBd)	Antenna Aperture (ft)	#of Channels	Transmitter Power (Watts)	Total ERP (Watts)	Total EIRP (Watts)	Calculated Power Density ($\mu W/cm^2$)	Allowable MPE ($\mu W/cm2$)	Calculated MPE%
A	10	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	GSM	60	63	15.35	4.94	1	10.00	342.77	562.34	0.000007	1000.00	0.000001
A	10	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	LTE	60	63	15.35	4.94	1	60.00	2056.61	3374.05	0.000039	1000.00	0.000004
A	10	T-Mobile	Ericsson	KRD901146-1_A	Panel	2100	LTE	60	63	15.35	4.94	1	120.00	4113.21	6748.10	0.000107	1000.00	0.000011
A	11	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	60	13	22.65	2.75	1	40.00	7363.09	12079.81	1.151501	1000.00	0.115150
A	11	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	60	13	22.65	2.75	1	15.00	2761.16	4529.93	0.431793	1000.00	0.043179
A	11	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	60	13	22.65	2.75	1	40.00	7363.09	12079.81	1.151501	1000.00	0.115150
A	11	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	60	13	22.65	2.75	1	15.00	2761.16	4529.93	0.431793	1000.00	0.043179
A	12	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	LTE	60	69	13.25	8	1	40.00	845.40	1386.95	0.000031	400.00	0.000008
A	12	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	5G	60	69	13.25	8	1	80.00	1690.79	2773.89	0.000062	400.00	0.000015
A	12	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	700	LTE	60	64	13.65	8	1	40.00	926.96	1520.76	0.000002	466.67	0.000000
A	12	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	1900	LTE	60	63	16.05	8	1	60.00	2416.30	3964.16	0.000039	1000.00	0.000004
B	13	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	GSM	180	63	15.35	4.94	1	10.00	342.77	562.34	0.000000	1000.00	0.000000
B	13	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	LTE	180	63	15.35	4.94	1	60.00	2056.61	3374.05	0.000002	1000.00	0.000000
B	13	T-Mobile	Ericsson	KRD901146-1_A	Panel	2100	LTE	180	63	15.35	4.94	1	120.00	4113.21	6748.10	0.000003	1000.00	0.000000
B	14	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	180	13	22.65	2.75	1	40.00	7363.09	12079.81	0.058933	1000.00	0.005893
B	14	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	180	13	22.65	2.75	1	15.00	2761.16	4529.93	0.022099	1000.00	0.002210
B	14	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	180	13	22.65	2.75	1	40.00	7363.09	12079.81	0.058933	1000.00	0.005893
B	14	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	180	13	22.65	2.75	1	15.00	2761.16	4529.93	0.022099	1000.00	0.002210
B	15	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	LTE	180	69	13.25	8	1	40.00	845.40	1386.95	0.000000	400.00	0.000000
B	15	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	5G	180	69	13.25	8	1	80.00	1690.79	2773.89	0.000000	400.00	0.000000
B	15	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	700	LTE	180	64	13.65	8	1	40.00	926.96	1520.76	0.000001	466.67	0.000000
B	15	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	1900	LTE	180	63	16.05	8	1	60.00	2416.30	3964.16	0.000001	1000.00	0.000000
C	16	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	GSM	300	63	15.35	4.94	1	10.00	342.77	562.34	0.000587	1000.00	0.000059
C	16	T-Mobile	Ericsson	KRD901146-1_A	Panel	1900	LTE	300	63	15.35	4.94	1	60.00	2056.61	3374.05	0.003522	1000.00	0.000352
C	16	T-Mobile	Ericsson	KRD901146-1_A	Panel	2100	LTE	300	63	15.35	4.94	1	120.00	4113.21	6748.10	0.004692	1000.00	0.000469
C	17	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	300	13	22.65	2.75	1	40.00	7363.09	12079.81	45.374700	1000.00	4.537470
C	17	T-Mobile	Ericsson	AIR6449_LTE_B41^	Panel	2500	LTE	300	13	22.65	2.75	1	15.00	2761.16	4529.93	17.014742	1000.00	1.701474
C	17	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	300	13	22.65	2.75	1	40.00	7363.09	12079.81	45.374700	1000.00	4.537470
C	17	T-Mobile	Ericsson	AIR6449_NR_B41^	Panel	2500	5G	300	13	22.65	2.75	1	15.00	2761.16	4529.93	17.014742	1000.00	1.701474
C	18	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	LTE	300	69	13.25	8	1	40.00	845.40	1386.95	0.001890	400.00	0.000472
C	18	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	600	5G	300	69	13.25	8	1	80.00	1690.79	2773.89	0.003780	400.00	0.000945
C	18	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	700	LTE	300	64	13.65	8	1	40.00	926.96	1520.76	0.002530	466.67	0.000542
C	18	T-Mobile	RFS	APXVAARR24_43-U-NA20	Panel	1900	LTE	300	63	16.05	8	1	60.00	2416.30	3964.16	0.005827	1000.00	0.000583
A	19	Metro PCS	RFS	APXV18-206517S-A20	Panel	1900	GSM	10	64	16.65	0	1	40.00	1849.52	3034.31	0.000985	1000.00	0.000099
B	20	Metro PCS	RFS	APXV18-206517S-A20	Panel	1900	GSM	120	64	16.65	0	1	40.00	1849.52	3034.31	0.000002	1000.00	0.000000
C	21	Metro PCS	RFS	APXV18-206517S-A20	Panel	1900	GSM	240	64	16.65	0	1	40.00	1849.52	3034.31	0.000098	1000.00	0.000010
															Cumulative Power Density ($\mu W/cm2$)	**128.187705**	**Cumulative MPE%**	**12.8206**

Table 2.2: Antenna Inventory & Power Data

3. Compliance Summary

The theoretical calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated composite MPE value for this site assuming all carriers present is 12.8206% of the allowable FCC established general public limit sampled at the ground level.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were within the allowable 100% threshold standard per the federal government.

Date: **December 21, 2022**

Infinigy
500 West Office Center Drive Suite 150
Fort Washington, PA 19034
(518) 690-0790
structural@infinigy.com

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**AT&T Mobility Equipment Change-Out**	
	Carrier Site Number:	CTL05048
	Carrier Site Name:	EAST HAVEN SOUTH
	Carrier FA Number:	10071016
Crown Castle Designation:	**Crown Castle BU Number:**	842862
	Crown Castle Site Name:	EAST HAVEN SOUTH
	Crown Castle JDE Job Number:	686237
	Crown Castle Order Number:	586266 Rev.0
Engineering Firm Designation:	**Infinigy Report Designation:**	1039-Z0001-B
Site Data:	**259 Commerce Street, East Haven, New Haven County, CT, 06512** **Latitude 41°15'22.88" Longitude -72°52'32.80"**	
Structure Information:	**Tower Height & Type:**	**58.0 ft Monopole**
	Mount Elevation:	**54.0 ft**
	Mount Type:	**10.5 ft Sector Frame**

Infinigy is pleased to submit this **"Mount Replacement Analysis Report"** to determine the structural integrity of AT&T Mobility's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Sector Frame **Sufficient**

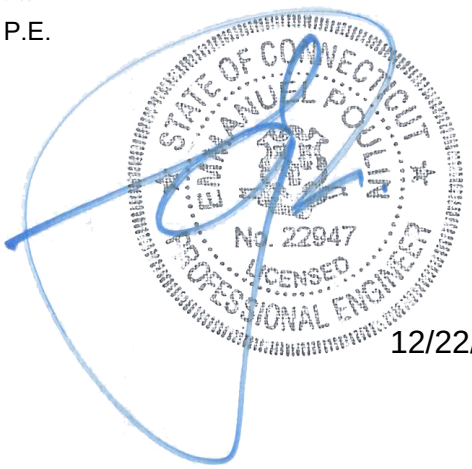
***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis utilizes an ultimate 3-second gust wind speed of 121 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Farhad Ahmadyar

Respectfully Submitted by: Emmanuel Poulin, P.E.

structural@infinigy.com



12/22/22

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 3-sector 10.5 ft Sector Frame, designed by Site Pro 1.

2) ANALYSIS CRITERIA

Building Code: 2021 IBC / 2022 Connecticut State Building Code
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 121 mph
Exposure Category: C
Topographic Factor at Base: 1.0
Topographic Factor at Mount: 1.0
Ice Thickness: 1.0 in
Wind Speed with Ice: 50 mph
Seismic S_s: 0.199
Seismic S_1: 0.053
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
54.0	57.0	3	ERICSSON	AIR 6419 B77G_CCIV3	10.5 ft Sector Frame [Site Pro 1 VFA10-HD3L4NP]
	55.0	3	CCI ANTENNAS	TPA65R-BU6D_CCIV2	
		3	KATHREIN	80010965	
		3	ERICSSON	RRUS 4449 B5/B12	
		3	ERICSSON	RRUS 4478 B14_CCIV2	
		3	ERICSSON	RRUS 8843 B2/B66A	
		3	ERICSSON	RRUS-32 B30	
		2	RAYCAP	DC6-48-60-18-8F	
		1	RAYCAP	DC6-48-60-18-8C	
	53.0	3	ERICSSON	AIR 6449 B77D_CCVI2	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	AT&T Mobility Application	586266 Rev.0	CCI Sites
Mount Manufacturer Drawings	Site Pro 1	VFA10-HD3L4NP	Infinigy
Loading Documents	AT&T Mobility	RFDS ID: 4392691	TSA
Previous Mount Analysis Report	Infinigy	10285544	CCI Sites

3.1) Analysis Method

RISA-3D (Version 20.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool V2.3.2, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B “Software Input Calculations”.

This analysis was performed in accordance with Crown Castle’s ENG-SOW-10208 *Mount Analysis* (Revision E). In addition, this analysis is in accordance with AT&T Mount Technical Guidance ATT-002-291-373.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	Q345 (GR 36)
HSS (Rectangular)	Q235-GB (GR 35)
Pipe	Q235-GB (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Sector Frame, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP9	54.0	32.8	Pass
	Horizontal(s)	HOR5		46.0	Pass
	Standoff(s)	SA9		29.4	Pass
	Bracing(s)	M56		47.3	Pass
	Connection Plate(s)	M76		62.5	Pass
	Mount Connection(s)	--		12.1	Pass

Structure Rating (max from all components) =	62.5%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for detailed mount connection calculations.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

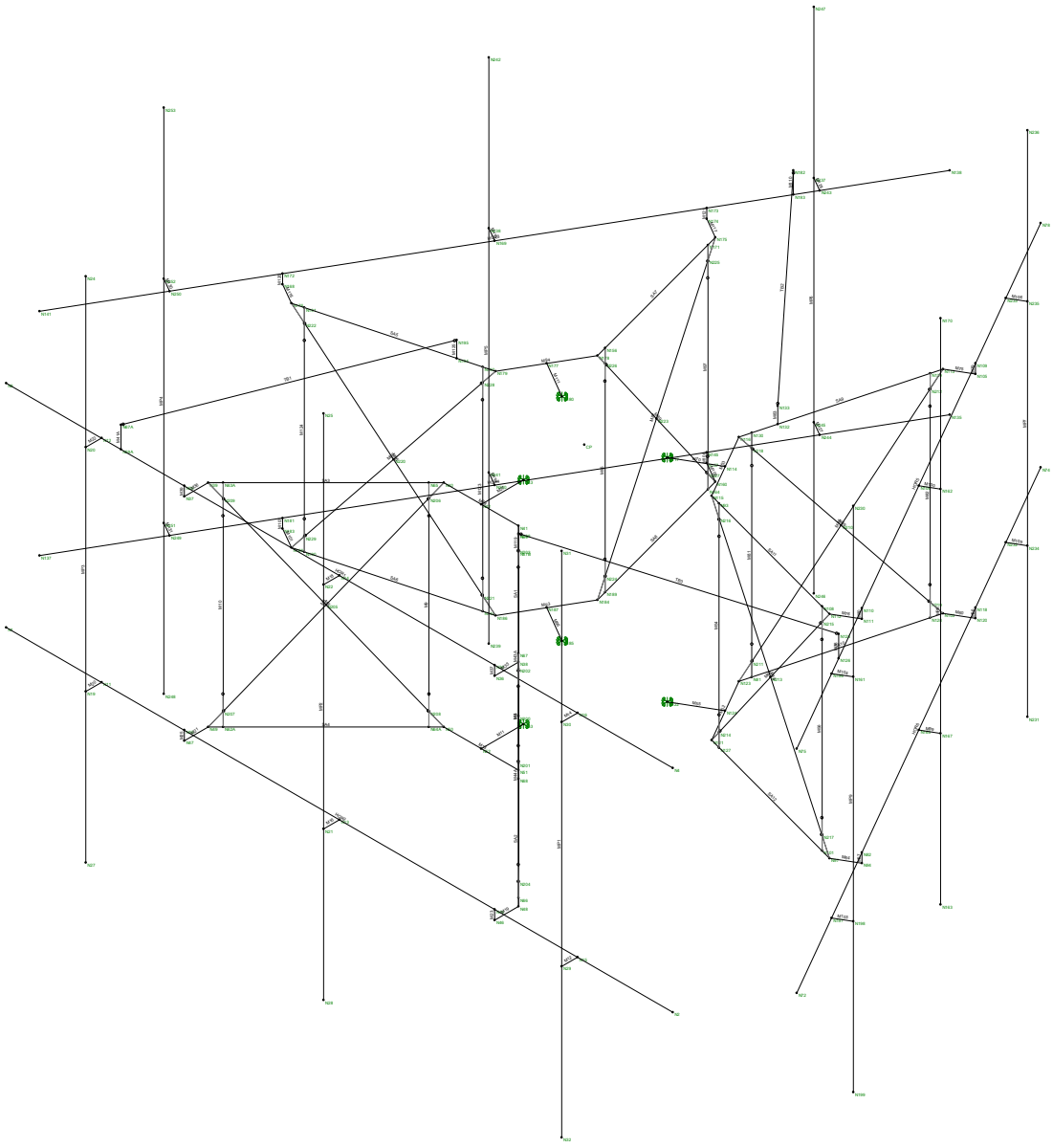
1. Installation of (1) Site Pro 1 VFA10-HD3L4NP sector frame.

2. Installation of (3) 2.0 STD 8’ long mount pipes per sector.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



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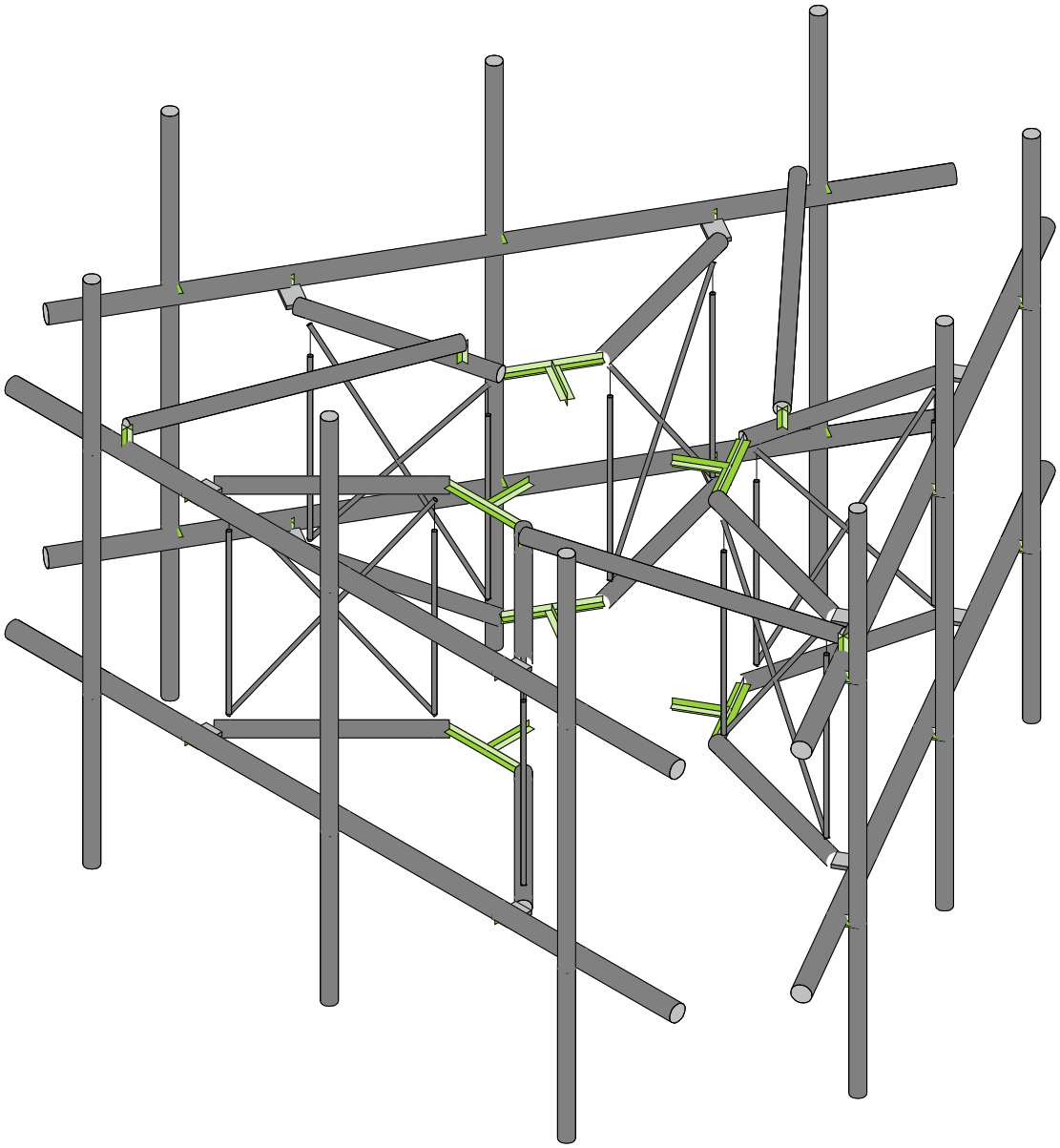

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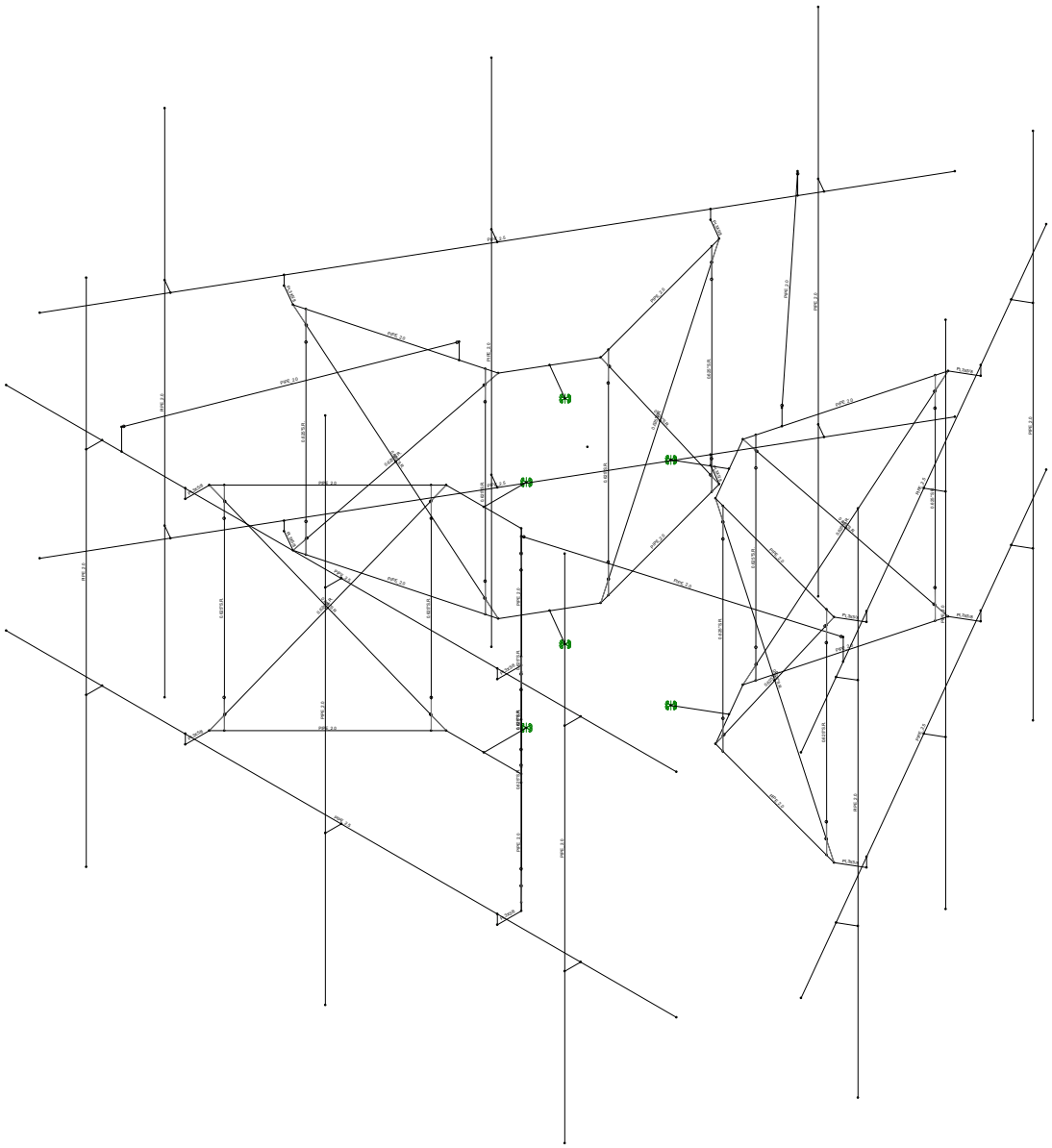

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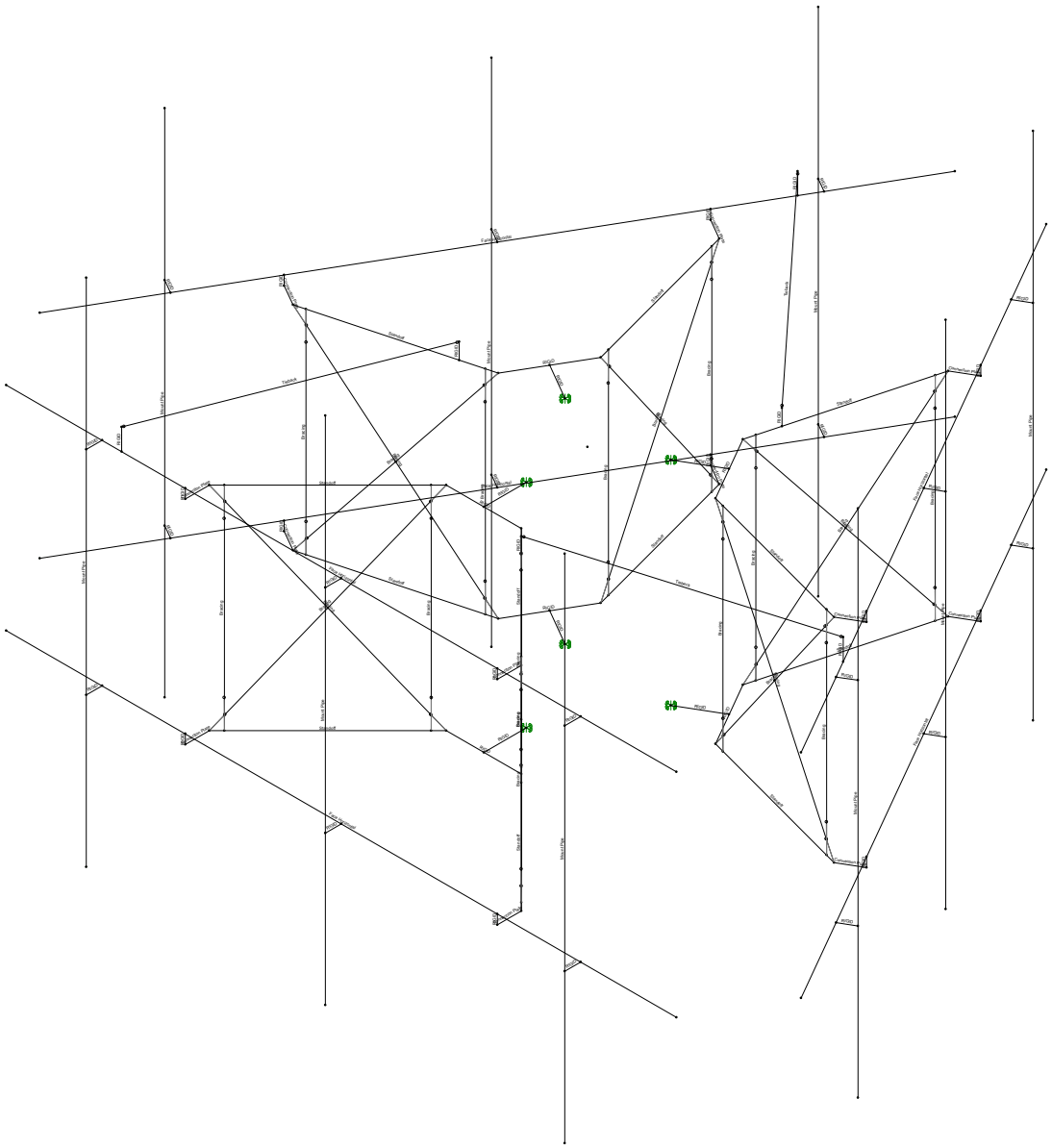

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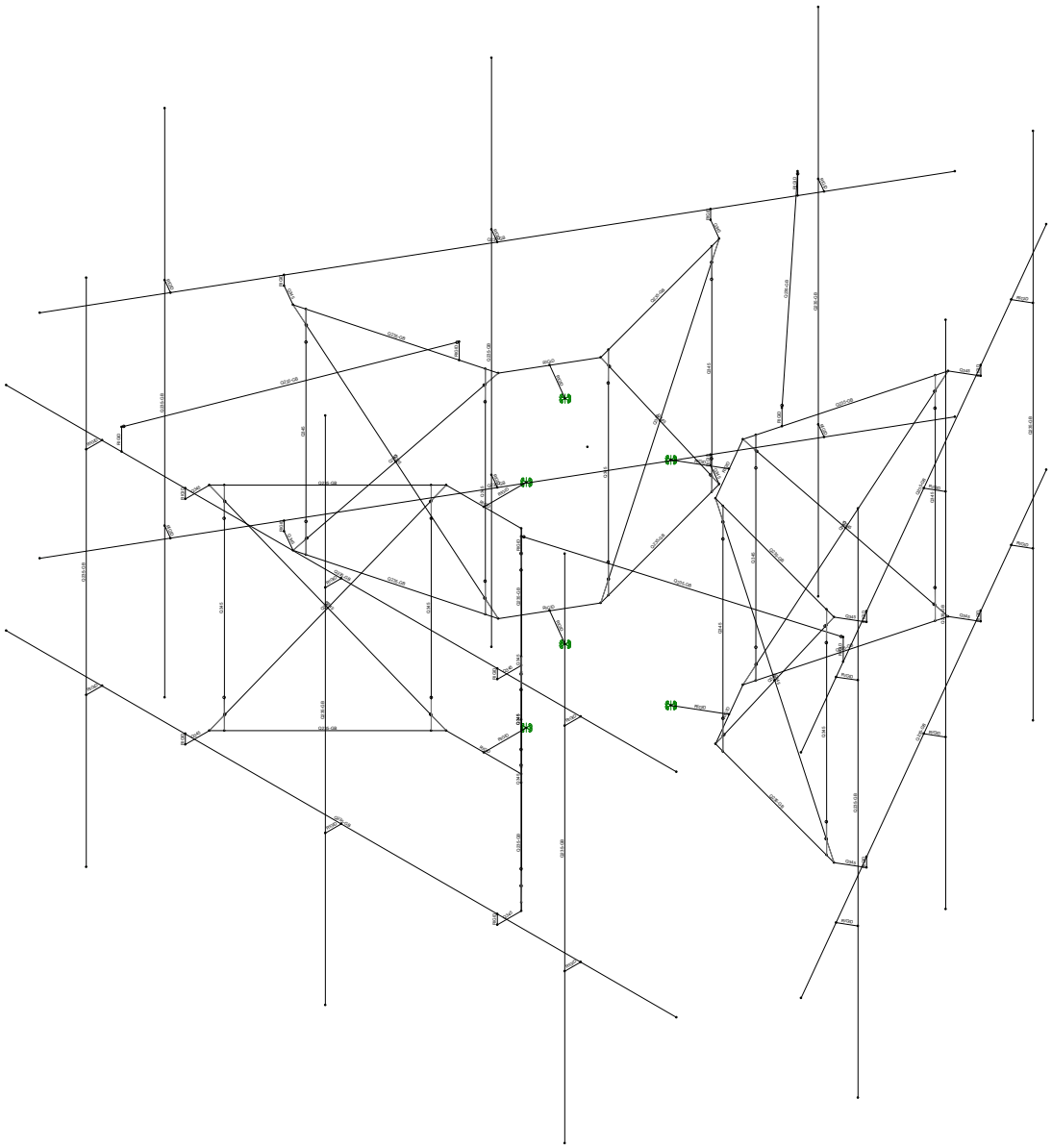

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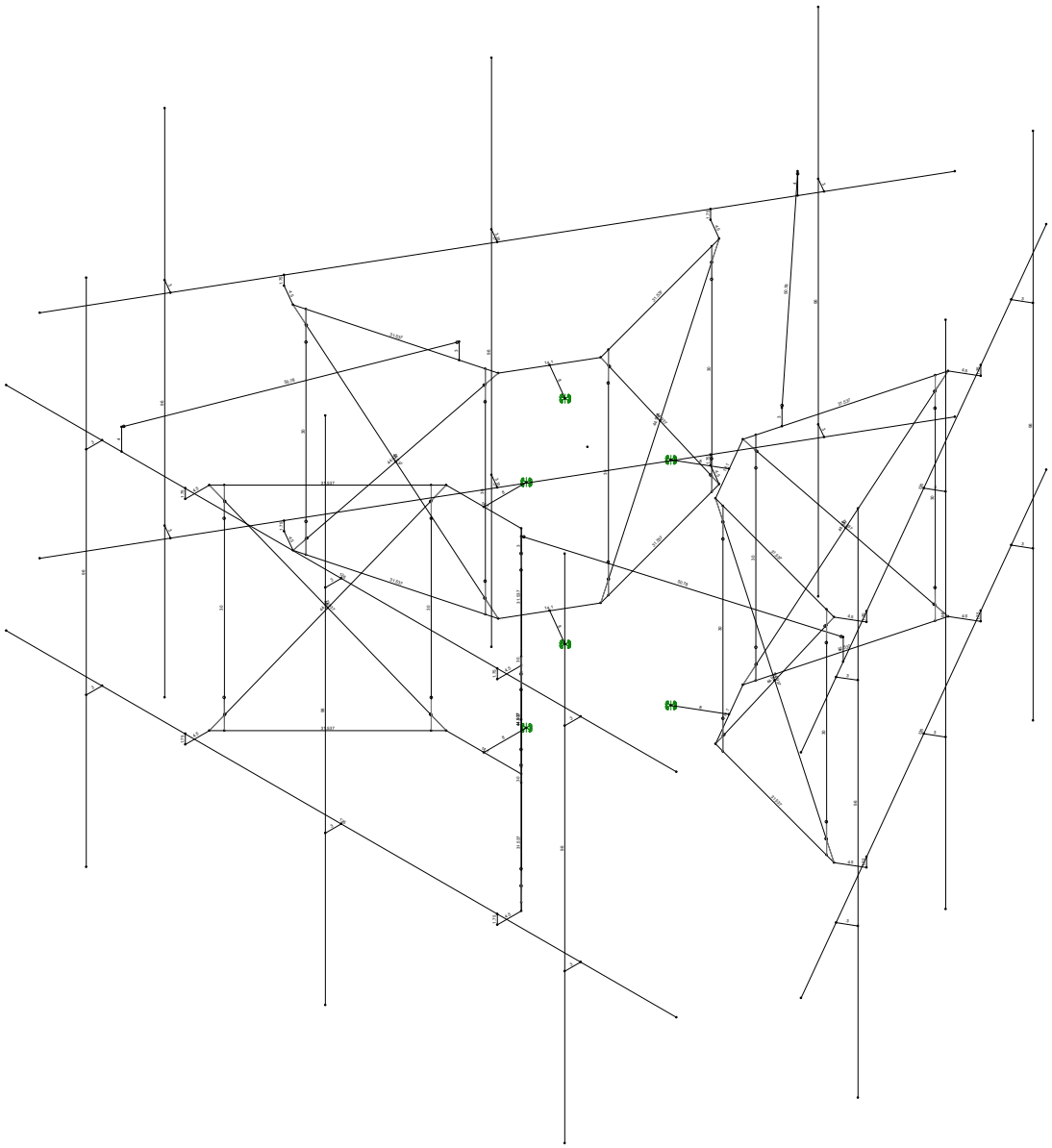

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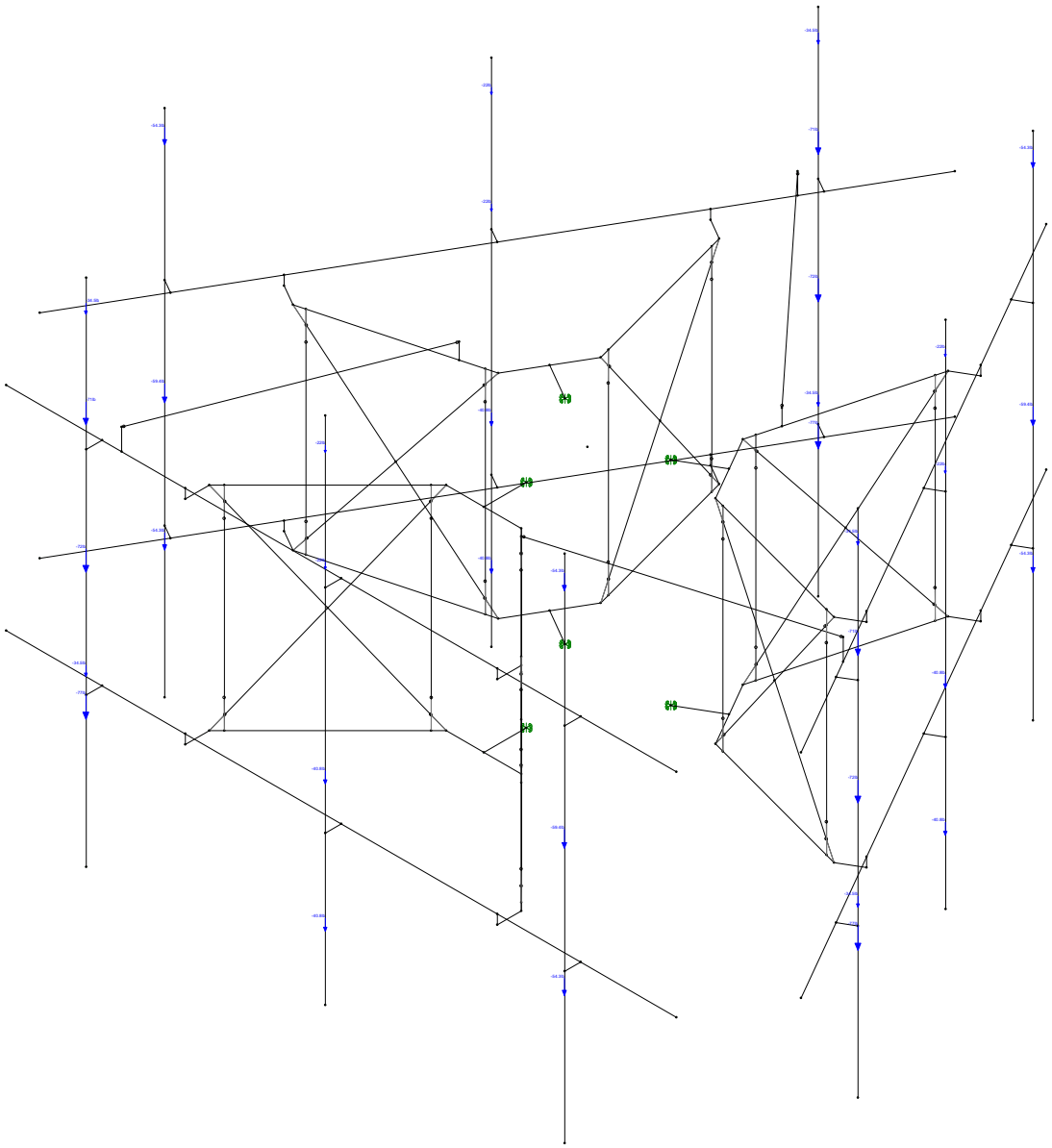

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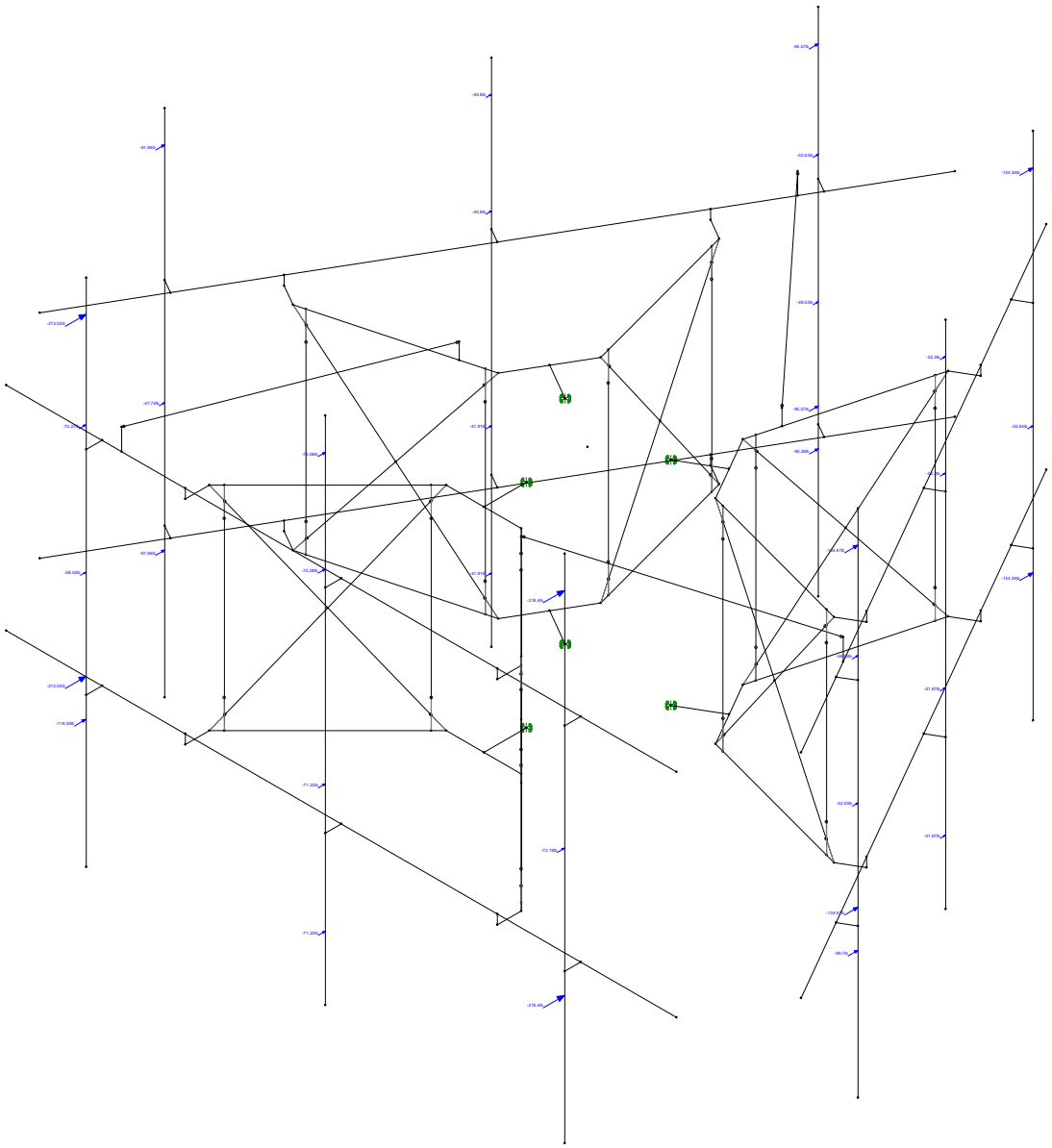

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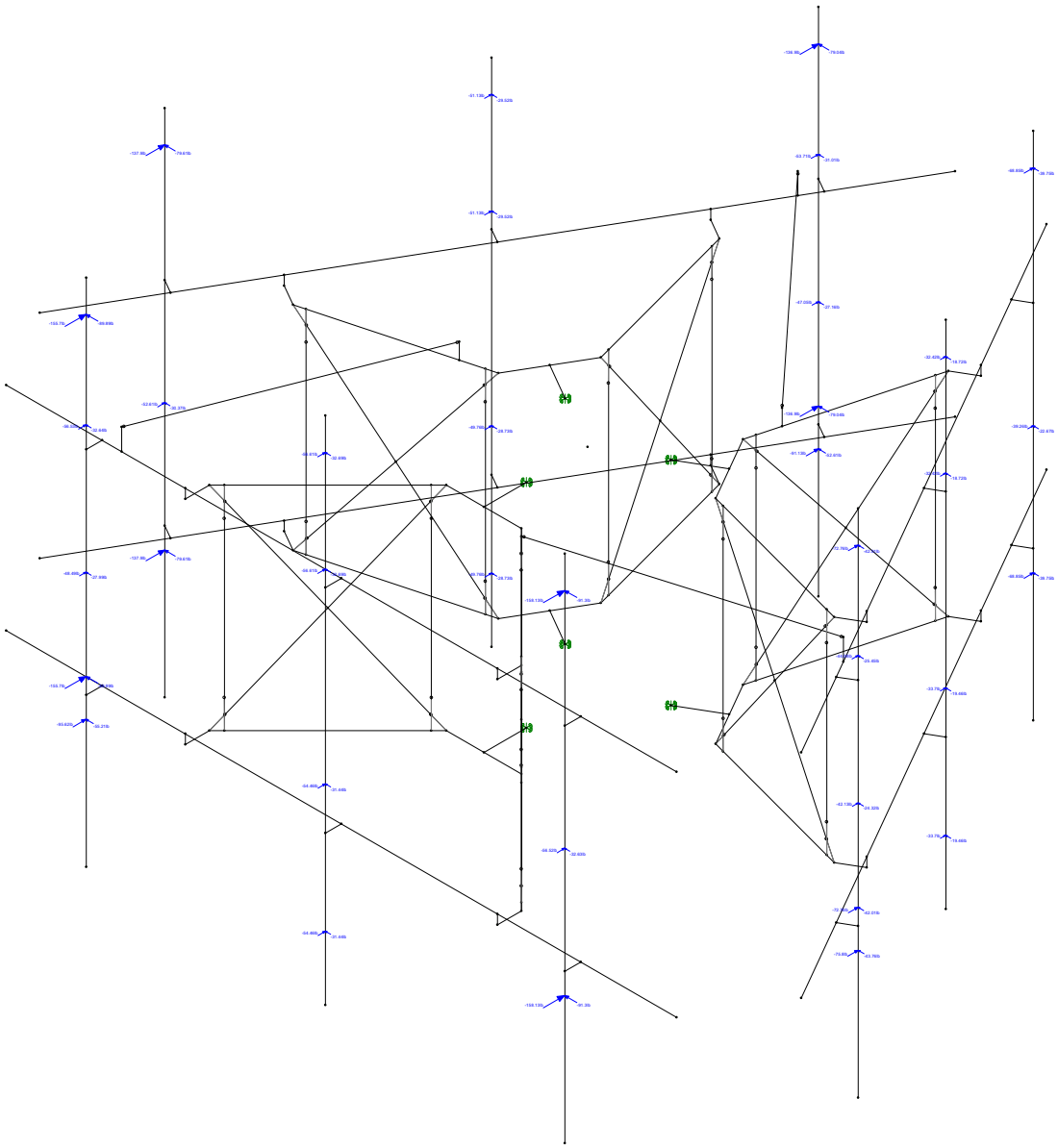

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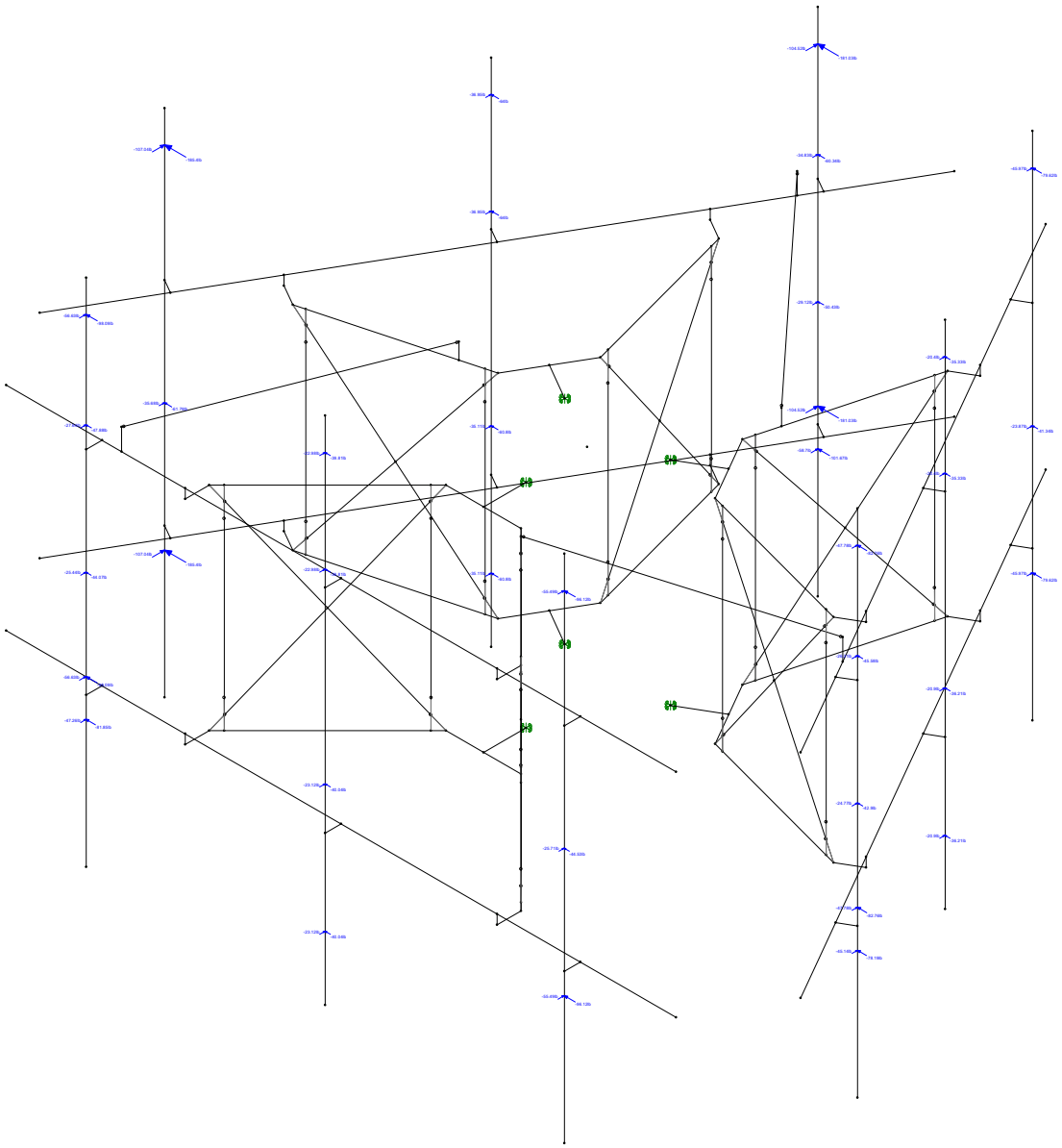

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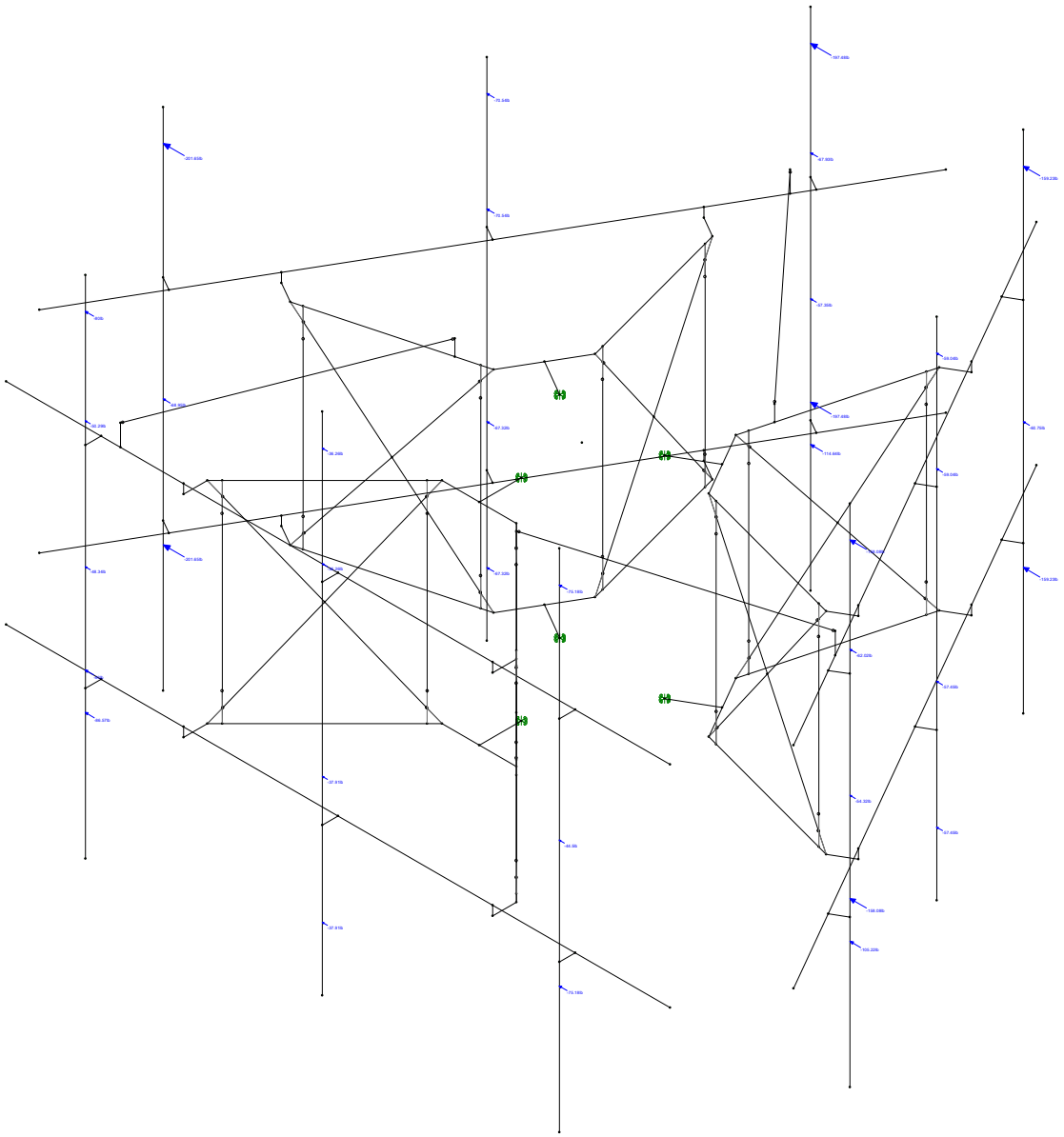

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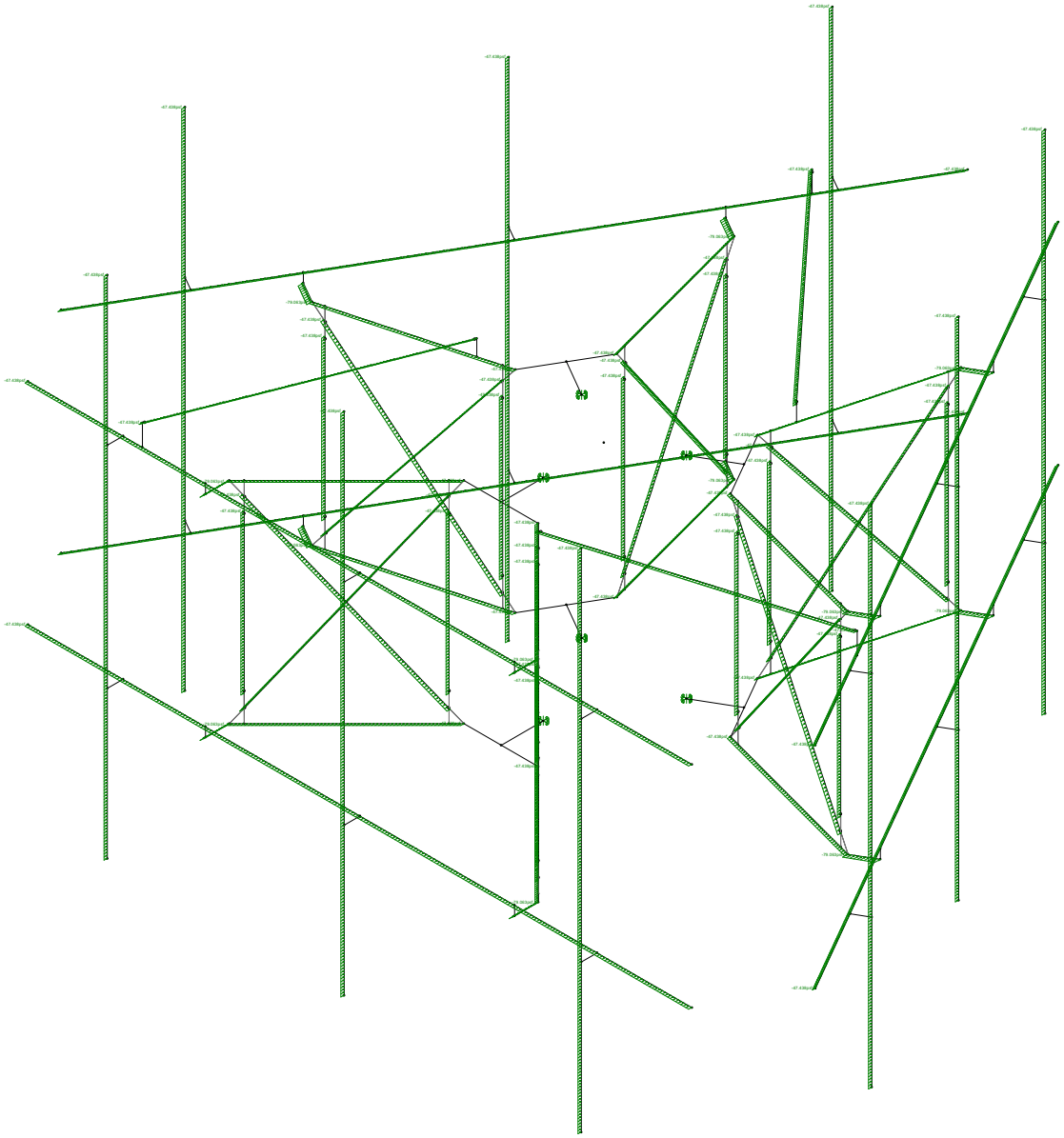

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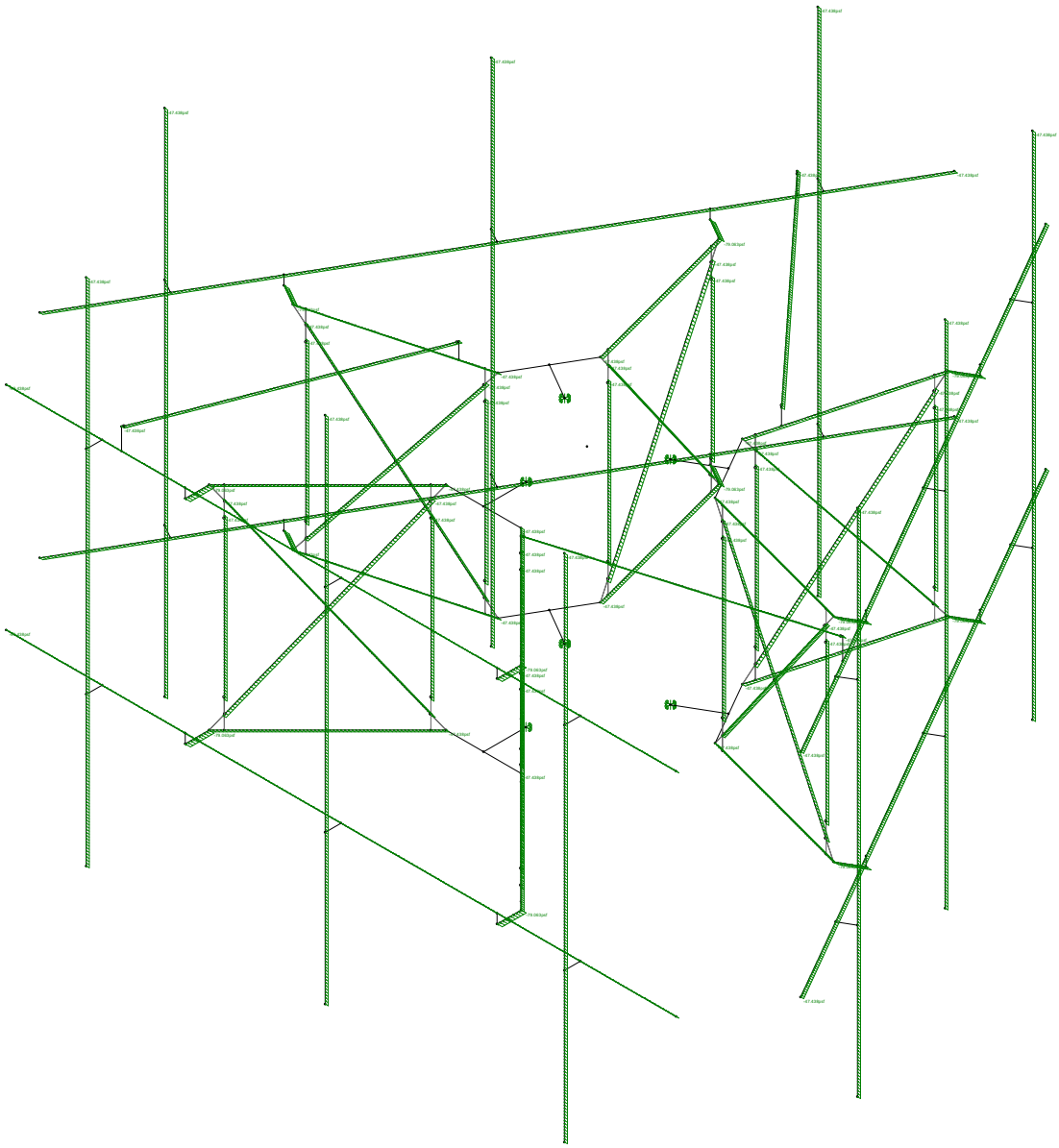

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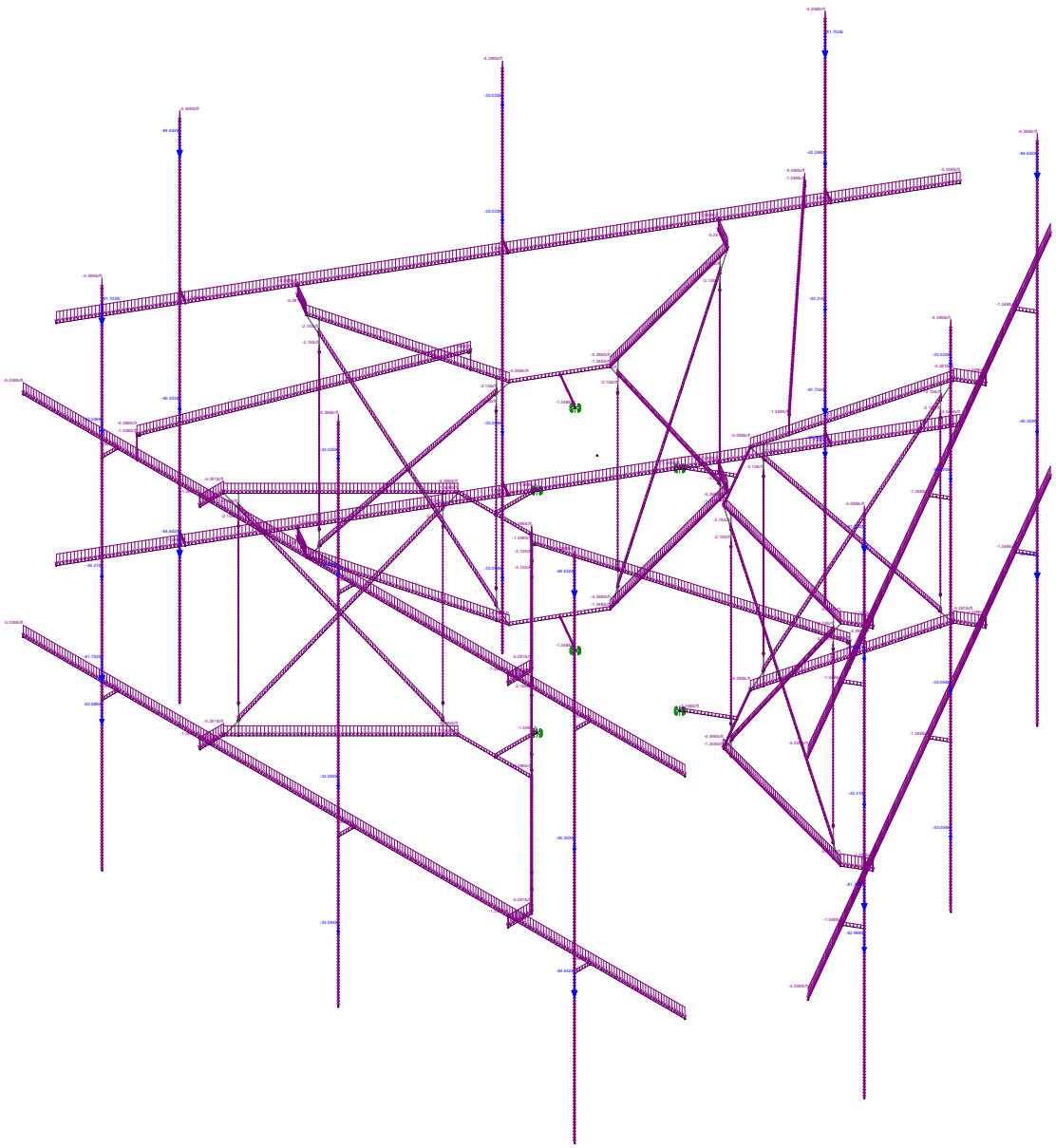

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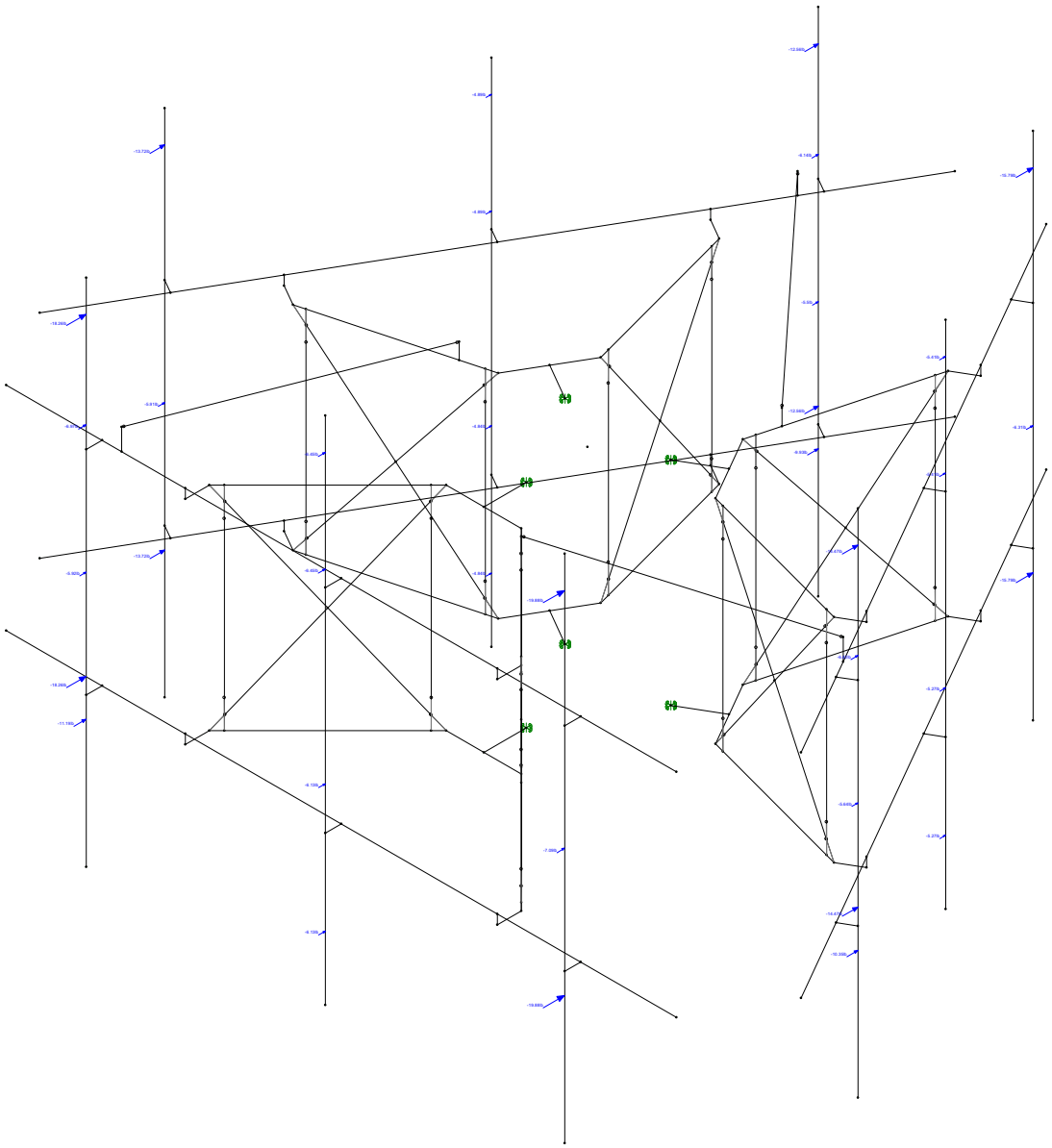

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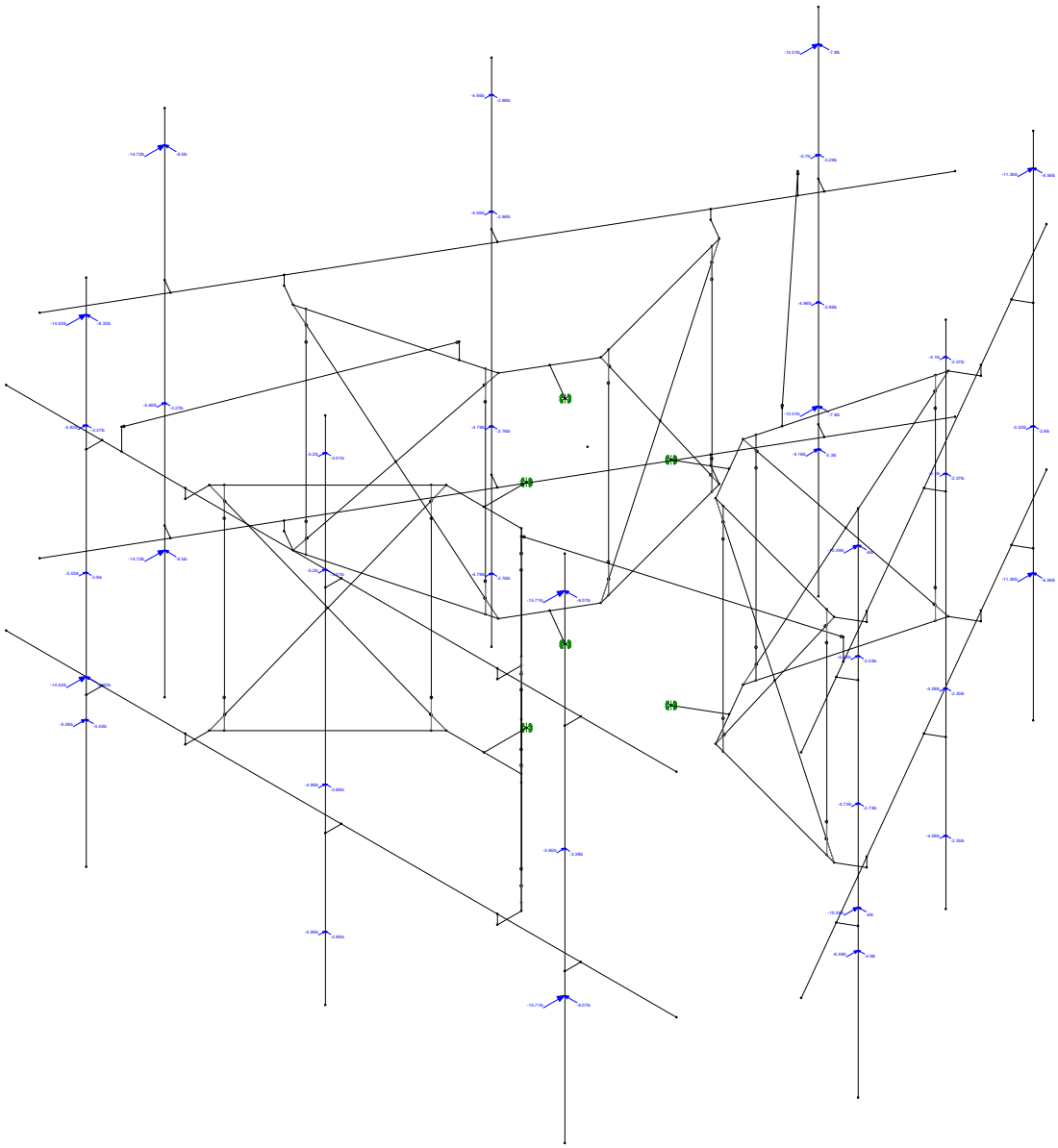

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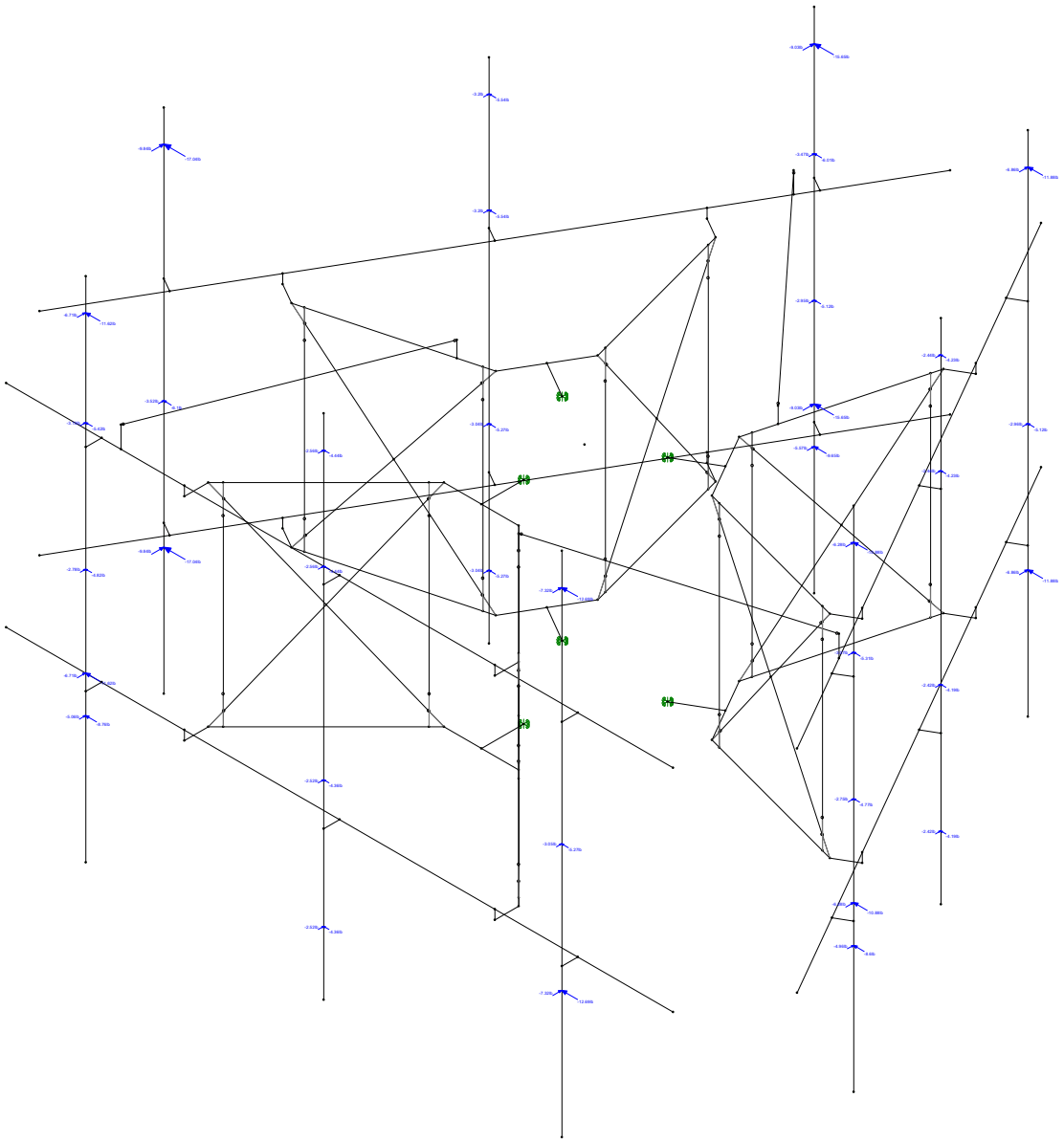

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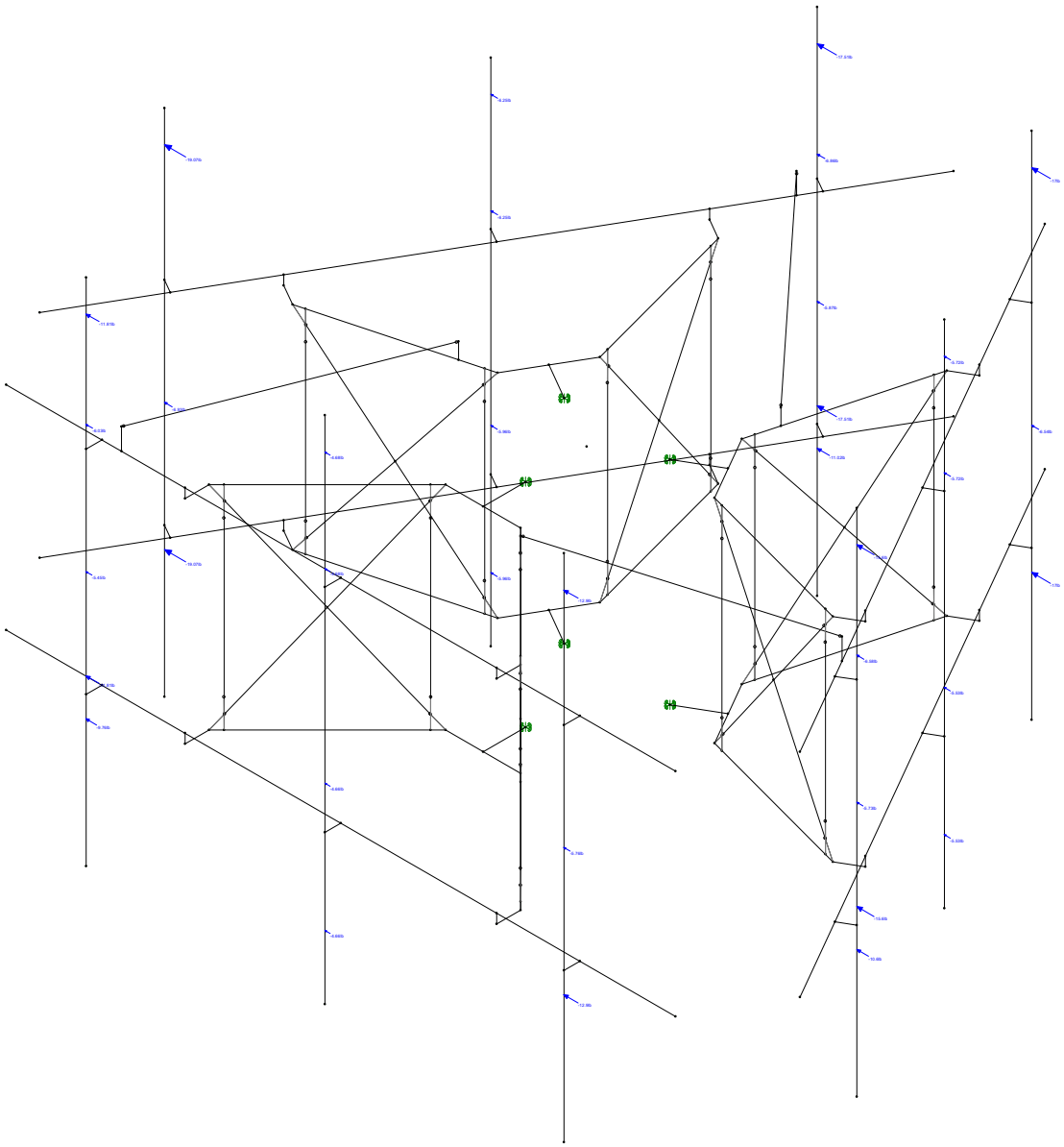

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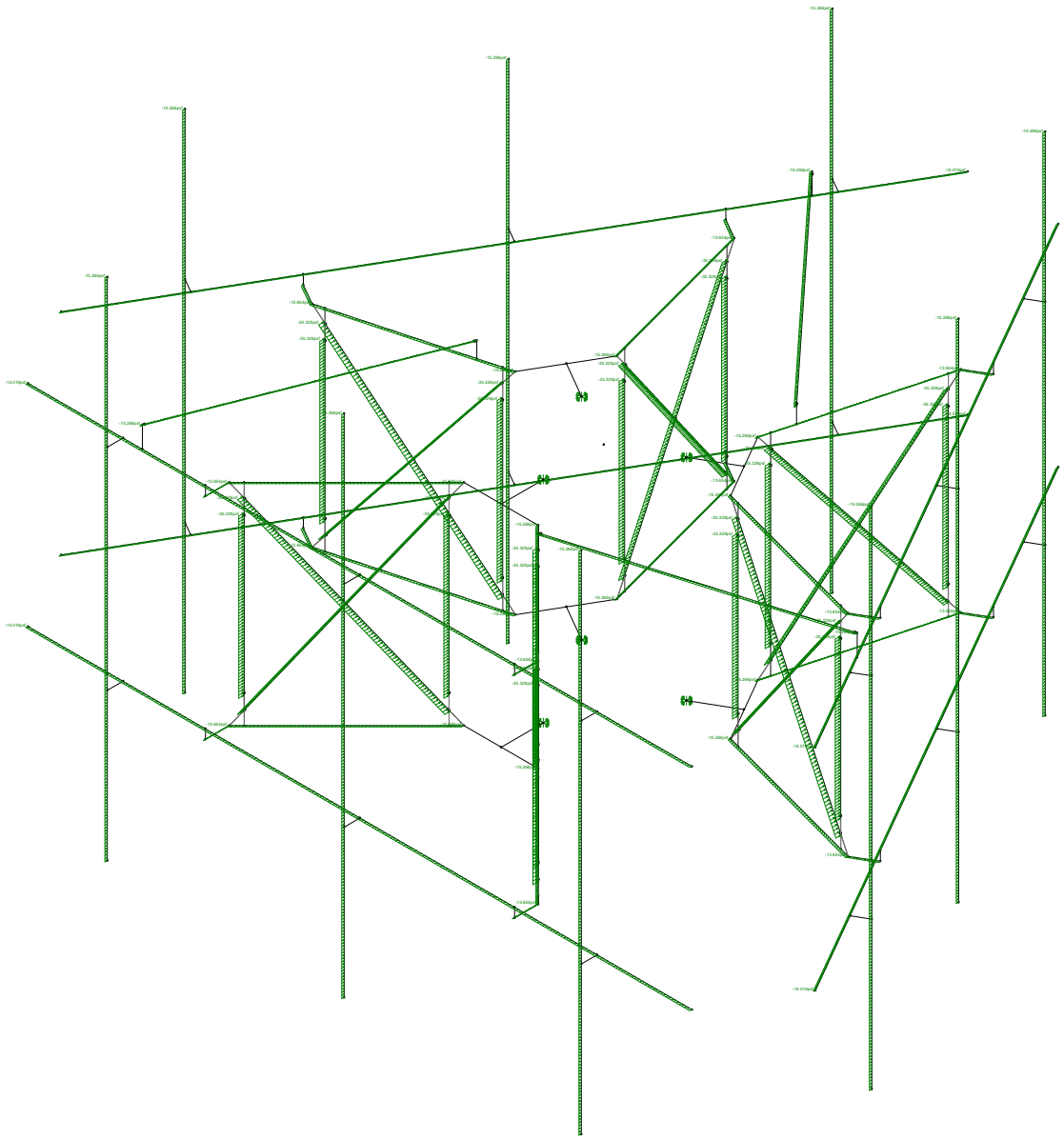

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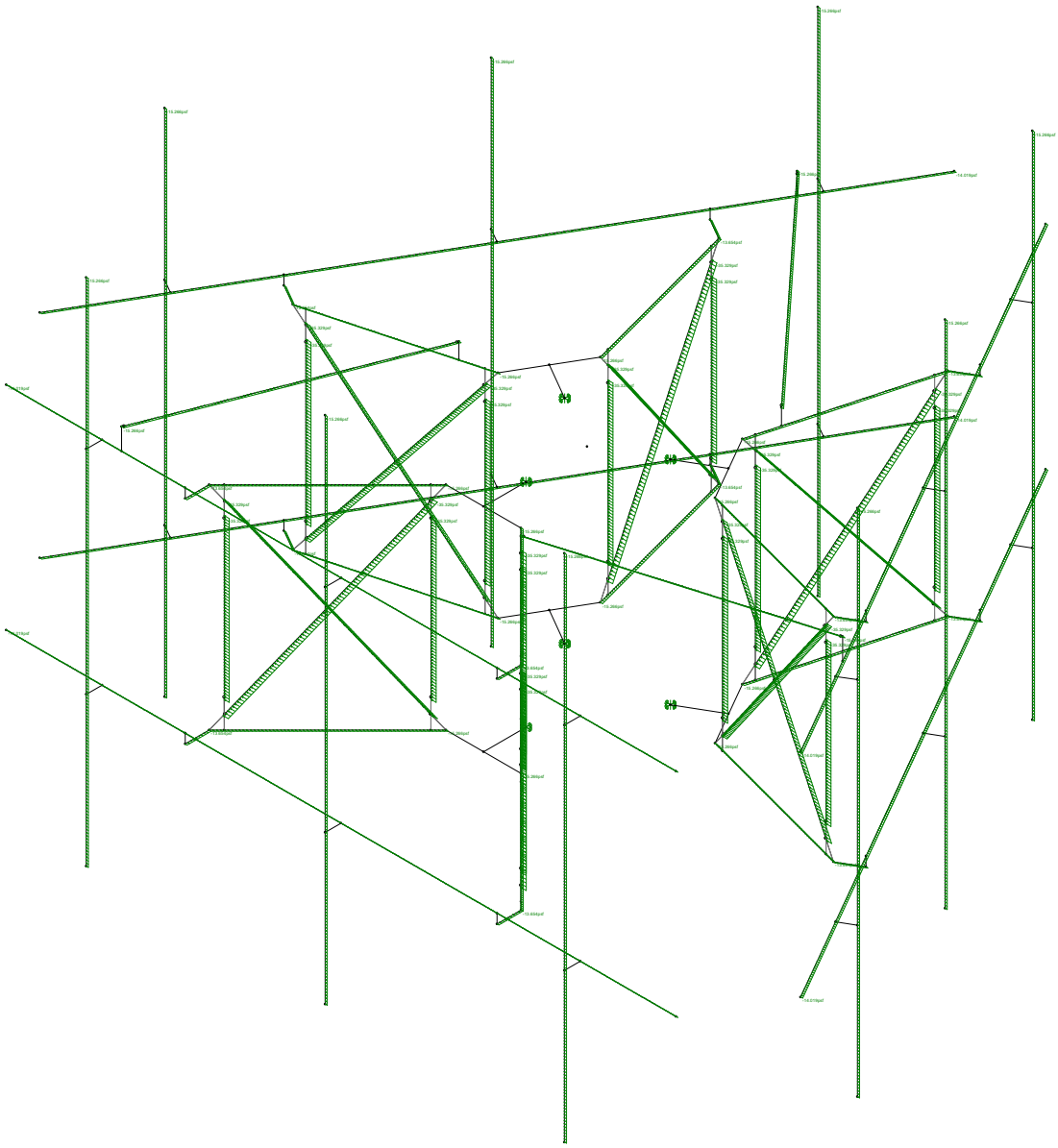

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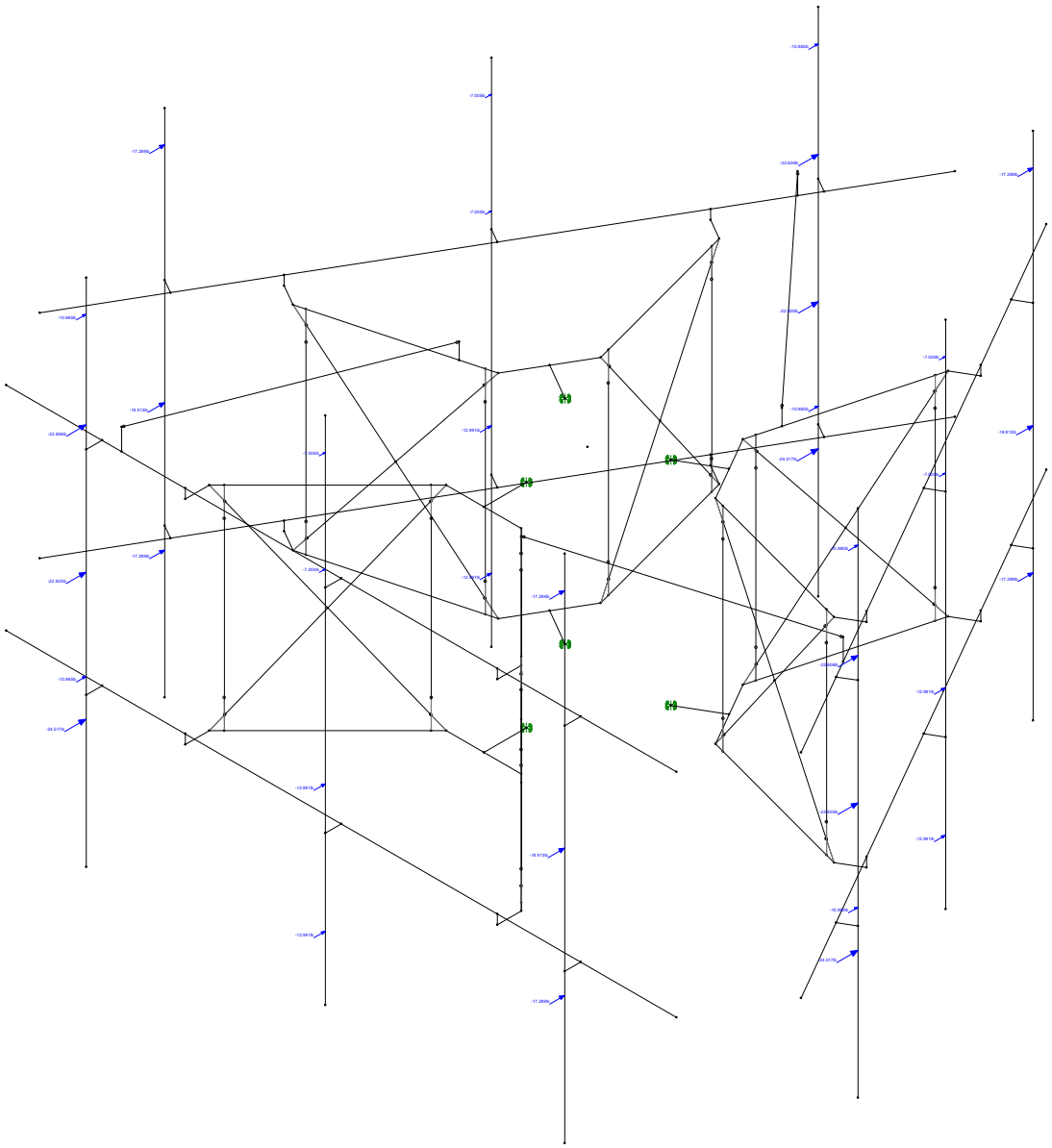
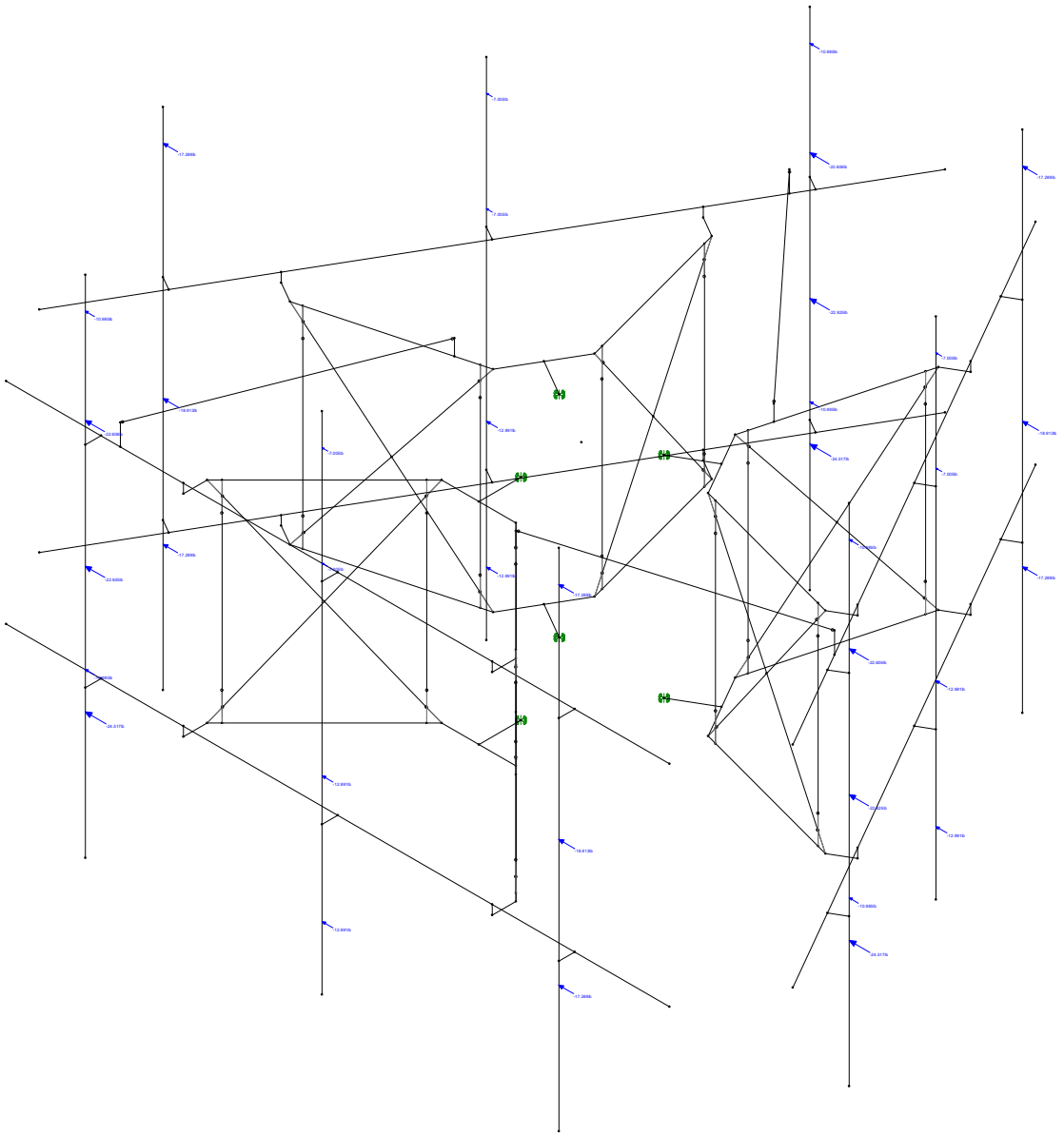
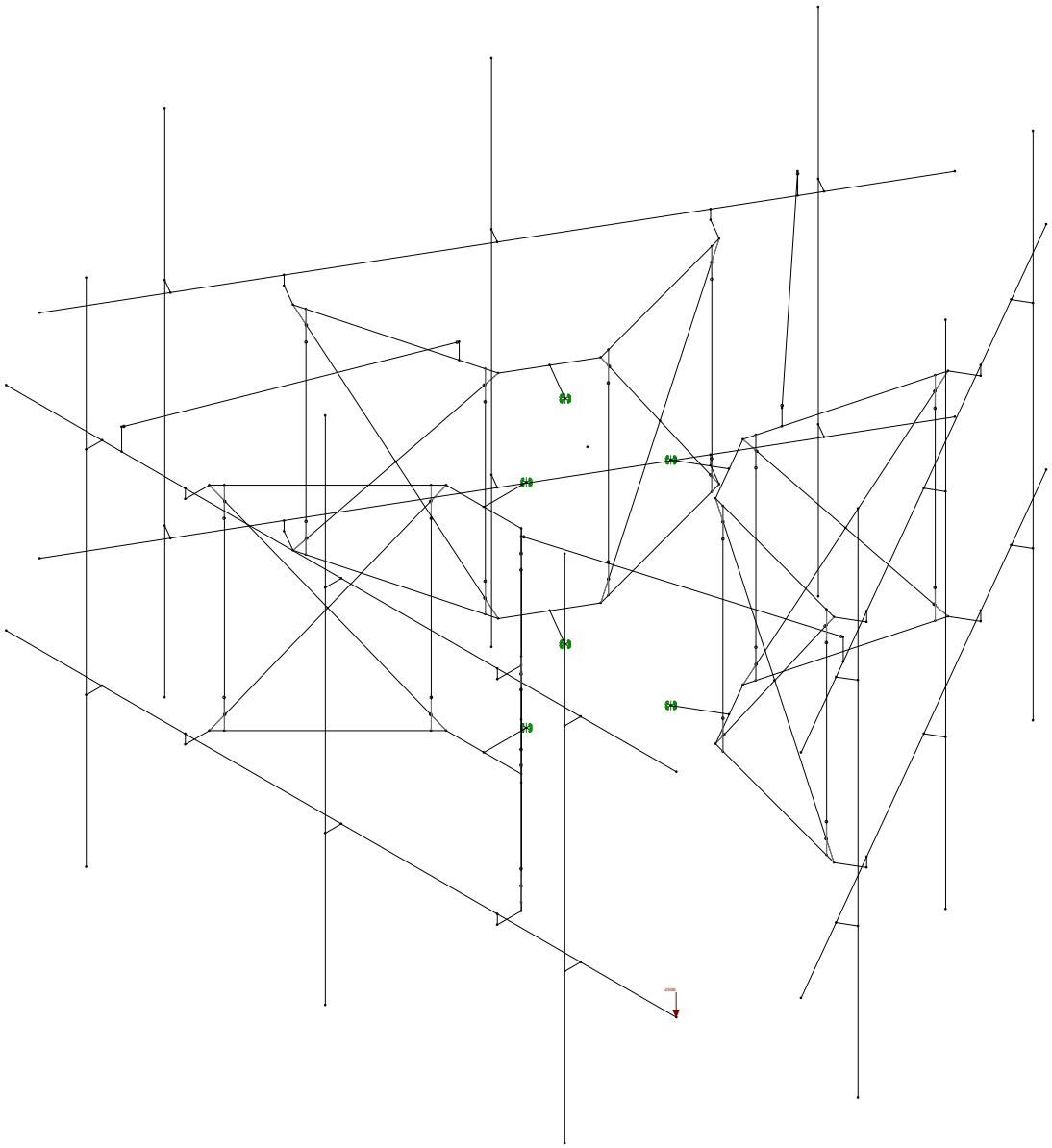
1039-Z0001-B		842862_loaded.r3d



Infinigy	842862	Seismic Loading 0
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d

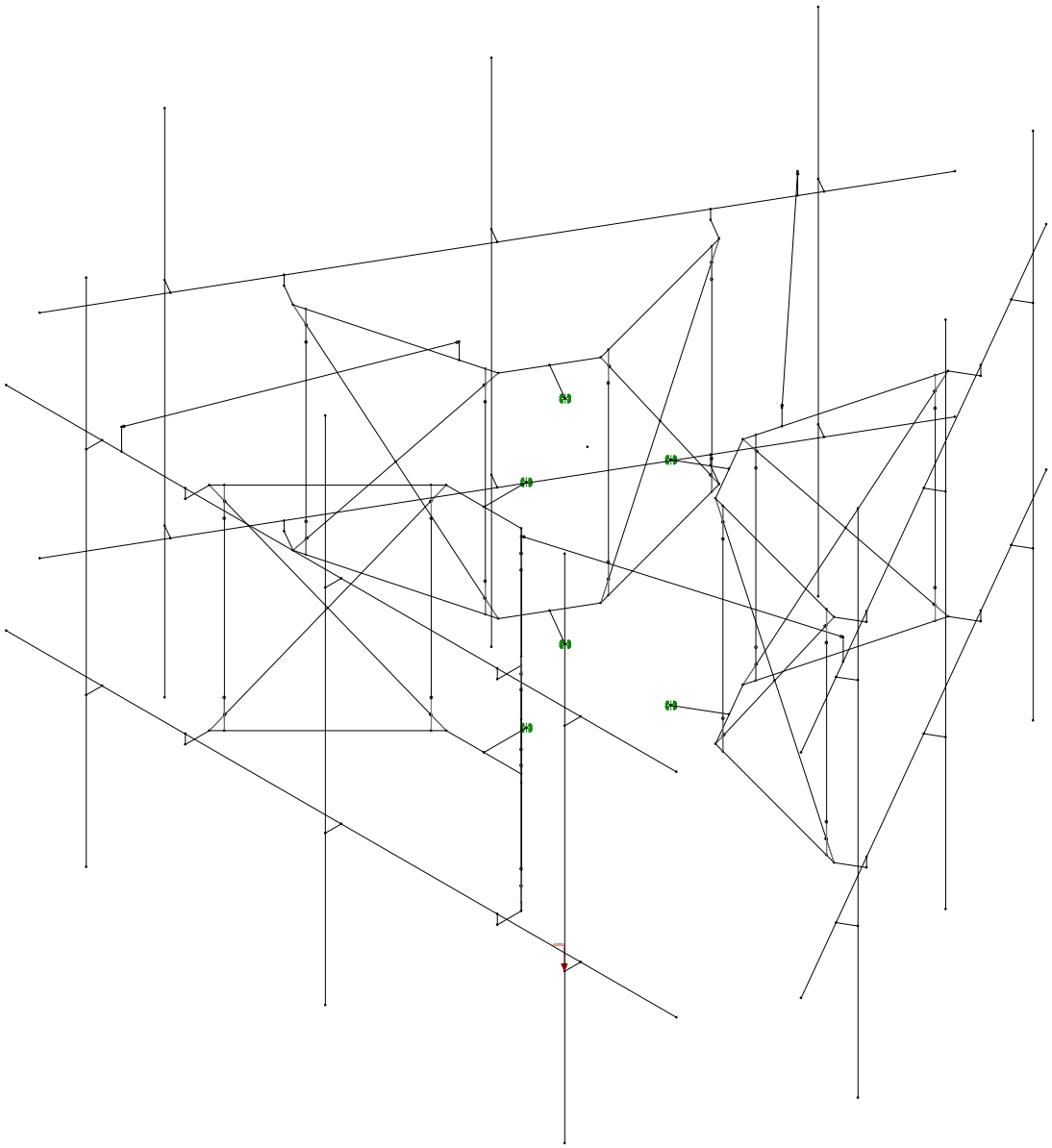


Infinigy	842862	Seismic Loading 90
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d



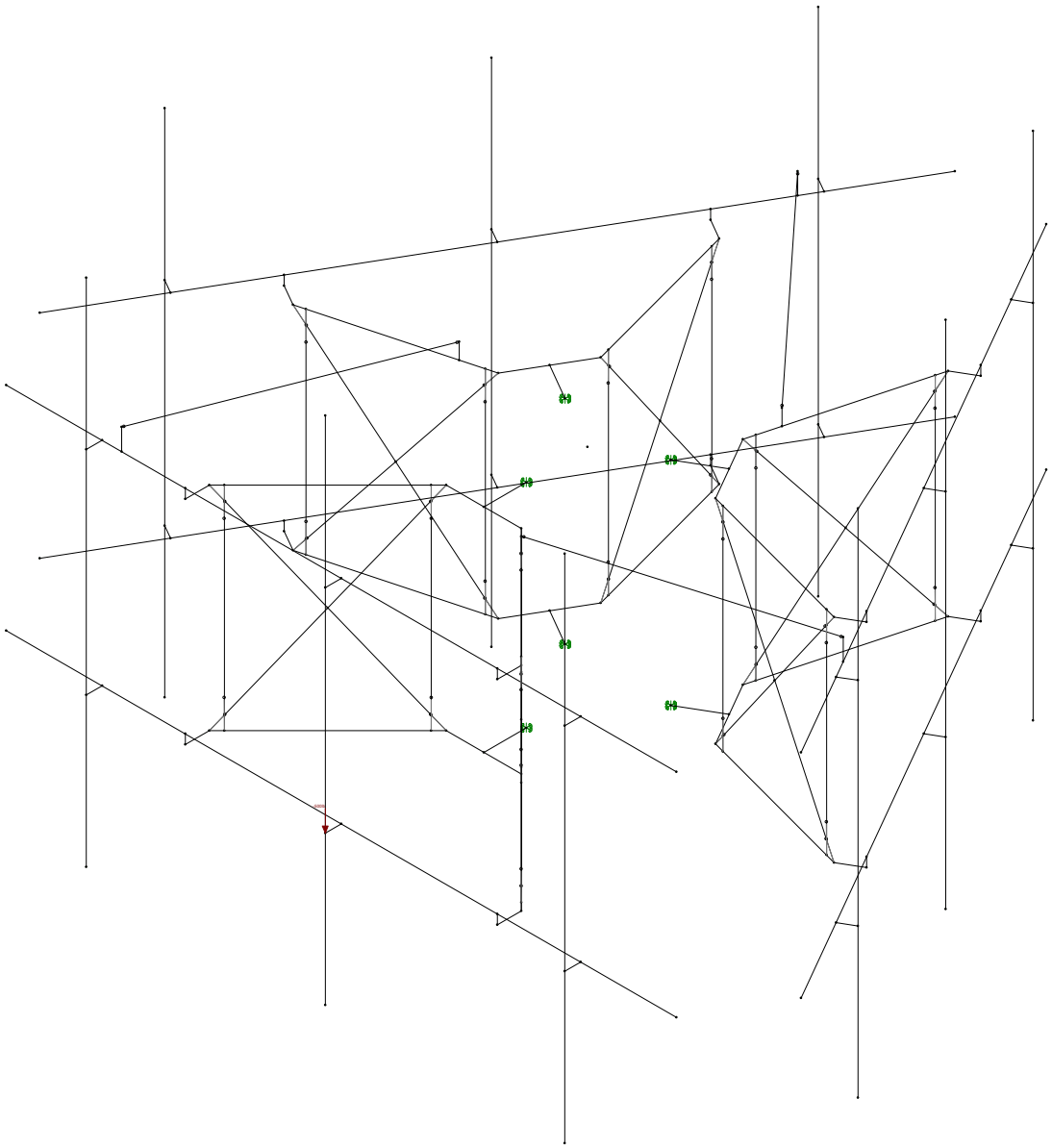
Loads: BLC 33, Service Live Loads

Infinigy	842862	Service
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d



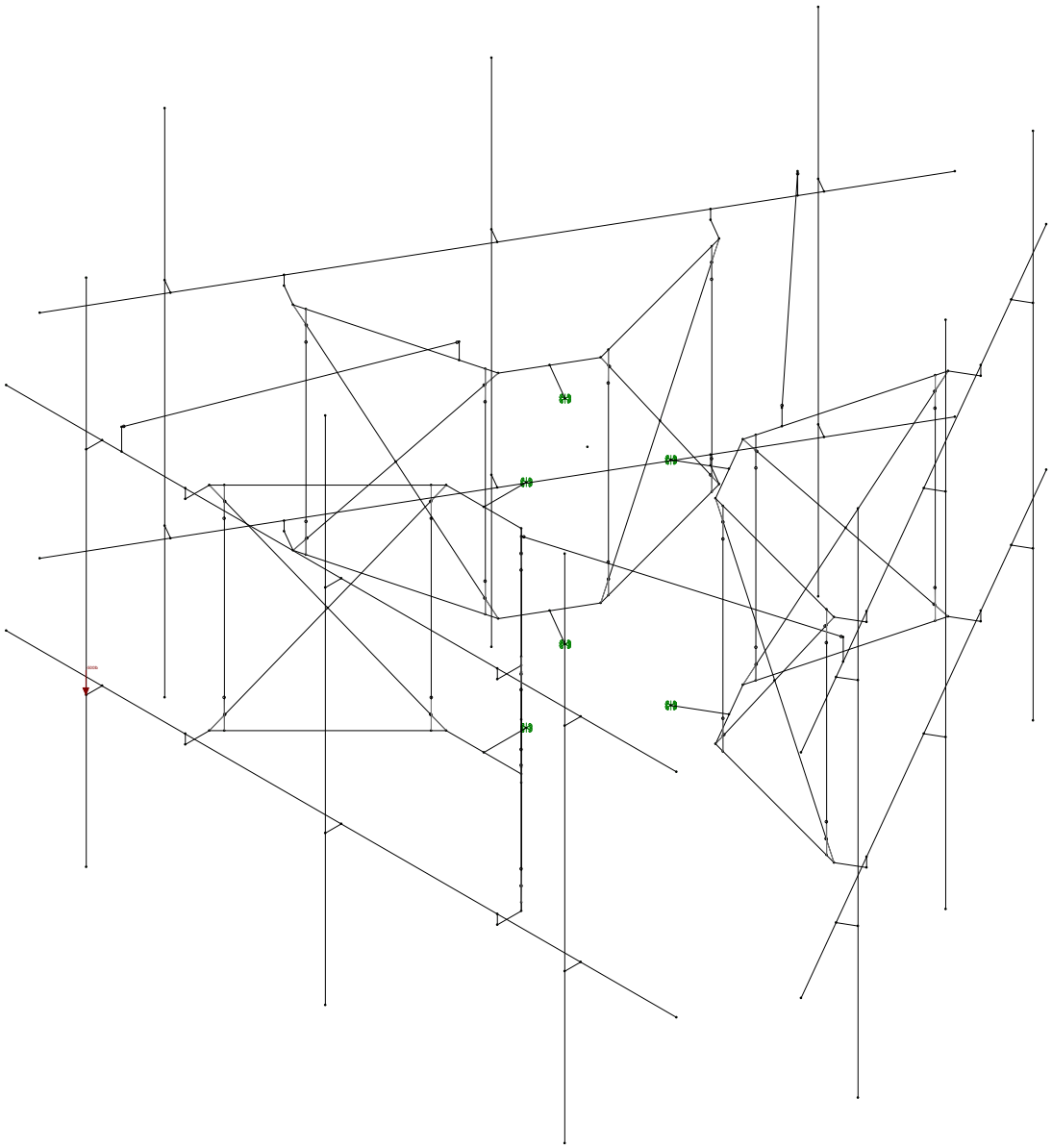
Loads: BLC 34, Maintenance Load 1

Infinigy	842862	Maintenance Load 1
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d



Loads: BLC 35, Maintenance Load 2

Infinigy	842862	Maintenance Load 2
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d



Infinigy	842862	Maintenance Load 3
FA		Dec 21, 2022 at 10:37 AM
1039-Z0001-B		842862_loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Program Inputs

INFINIGY

Infinigy Load Calculator V2.3.2

PROJECT INFORMATION		
Client:	Crown Castle	
Carrier:	AT&T Mobility	
Engineer:	Farhad Ahmadyar	

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	C	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	35.45	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Sector Frame	
Num Sectors:	3	
Centerline AGL:	54.00	ft
Tower Height AGL:	58.00	ft

TOPOGRAPHIC DATA		
Topo Feature:	N/A	
Slope Distance:	N/A	ft
Crest Distance:	N/A	ft
Crest Height:	N/A	ft

FACTORS		
Directionality Fact. (K_d):	0.950	
Ground Ele. Factor (K_e):	0.999	*Rev H Only
Rooftop Speed-Up (K_s):	1.000	*Rev H Only
Topographic Factor (K_{zt}):	1.000	
Gust Effect Factor (G_h):	1.000	

CODE STANDARDS		
Building Code:	2021 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-16	

WIND AND ICE DATA		
Ultimate Wind (V_{ult}):	121	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	1	in
Flat Pressure:	79.063	psf
Round Pressure:	47.438	psf
Ice Wind Pressure:	8.100	psf

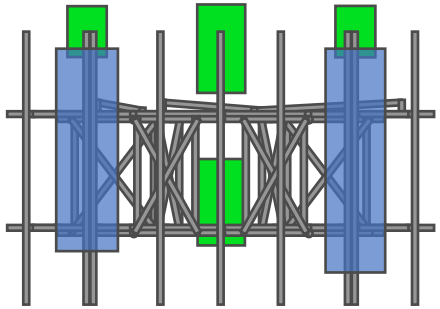
SEISMIC DATA		
Short-Period Accel. (S_s):	0.199	g
1-Second Accel. (S_1):	0.053	g
Short-Period Design (S_{DS}):	0.212	
1-Second Design (S_{D1}):	0.085	
Short-Period Coeff. (F_a):	1.600	
1-Second Coeff. (F_v):	2.400	
Amplification Factor (A_s):	3.000	
Response Mod. Coeff. (R):	2.000	

Program Inputs

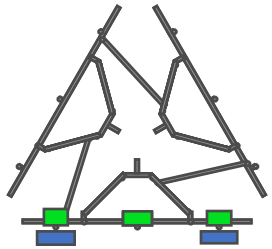
INFINIGY

Infinigy Load Calculator V2.3.2

ELEVATION VIEW



PLAN VIEW



APPURTENANCE INFORMATION

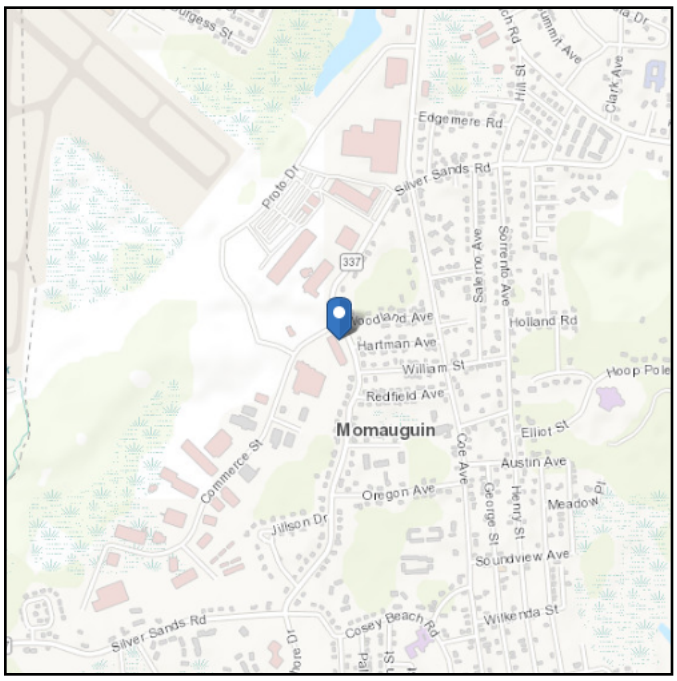
Appurtenance Name	Elevation	Qty.	K_a	q_z (psf)	EPA_N (ft^2)	EPA_T (ft^2)	Wind F_z (lbs)	Wind F_x (lbs)	Weight (lbs)	Seismic F (lbs)	Member (α sector)
CCI ANTENNAS TPA65R-BU6D_CCIV2	55.0	3	0.90	39.68	11.93	4.48	426.09	160.01	69.00	21.97	MP3
KATHREIN 80010965	55.0	3	0.90	39.68	12.23	4.21	436.81	150.36	108.60	34.58	MP1
ERICSSON AIR 6419 B77G_CCIV3	57.0	3	0.90	39.98	4.17	2.02	150.15	72.52	44.00	14.01	MP2
ERICSSON AIR 6449 B77D_CCVI2	53.0	3	0.90	39.38	4.02	2.14	142.43	75.82	81.60	25.98	MP2
ERICSSON RRUS 4449 B5/B12	55.0	3	0.90	39.68	1.97	1.41	70.27	50.29	71.00	22.61	MP3
ERICSSON RRUS 4478 B14_CCIV2	55.0	3	0.90	39.68	2.02	1.25	72.19	44.50	59.40	18.91	MP1
ERICSSON RRUS 8843 B2/B66A	55.0	3	0.90	39.68	1.64	1.35	58.54	48.34	72.00	22.92	MP3
ERICSSON RRUS-32 B30	55.0	3	0.90	39.68	3.31	2.42	118.36	86.57	77.00	24.52	MP3
RAYCAP DC6-48-60-18-8C	55.0	1	0.90	39.68	2.74	2.74	97.74	97.74	26.20	8.34	Leg/Flush
RAYCAP DC6-48-60-18-8F	55.0	2	0.90	39.68	2.04	2.04	72.85	72.85	18.90	6.02	Leg/Flush

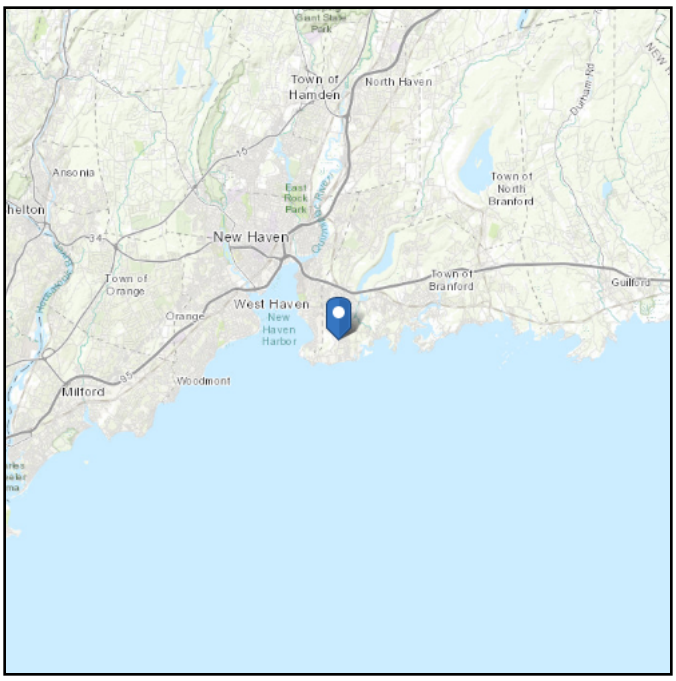
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 35.45 ft (NAVD 88)
Latitude: 41.256356
Longitude: -72.875778





Wind

Results:

Wind Speed	121 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Aug 10 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

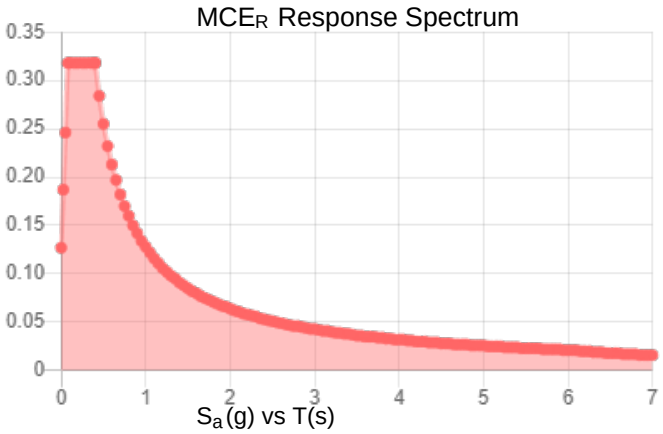
Seismic

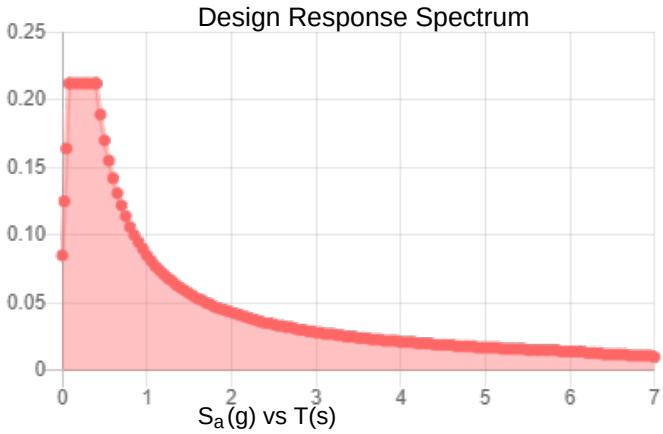
Site Soil Class: D - Default (see Section 11.4.3)

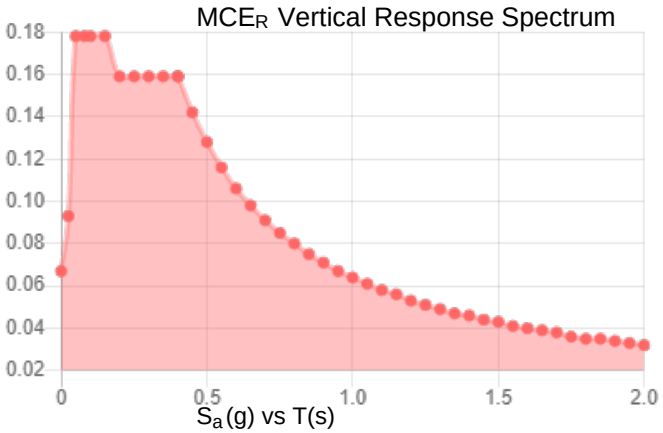
Results:

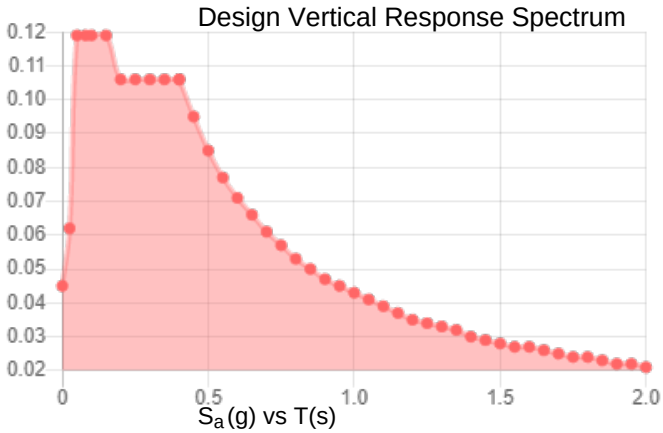
S_S :	0.199	S_{D1} :	0.085
S_1 :	0.053	T_L :	6
F_a :	1.6	PGA :	0.111
F_v :	2.4	PGA_M :	0.175
S_{MS} :	0.318	F_{PGA} :	1.578
S_{M1} :	0.128	I_e :	1
S_{DS} :	0.212	C_v :	0.7

Seismic Design Category B









Data Accessed: **Wed Aug 10 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Aug 10 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M3	N38	N51		Bracing	Beam	None	Q345	Typical
2	M4	N41	N48		Bracing	Beam	None	Q345	Typical
3	M5	N40	N49		Bracing	Beam	None	Q345	Typical
4	M6	N39	N50		Bracing	Beam	None	Q345	Typical
5	M9	N65	N64A		Bracing	Beam	None	Q345	Typical
6	M10	N63A	N62A		Bracing	Beam	None	Q345	Typical
7	M11	N53	N52	90	RIGID	None	None	RIGID	Typical
8	M12	N15	N29		RIGID	None	None	RIGID	Typical
9	M13	N50	N51		RIGID	None	None	RIGID	Typical
10	M14	N16	N30		RIGID	None	None	RIGID	Typical
11	SA2	N51	N48		Standoff	Beam	None	Q235-GB	Typical
12	M16	N13	N21		RIGID	None	None	RIGID	Typical
13	SA4	N50	N49		Standoff	Beam	None	Q235-GB	Typical
14	M18	N14	N22		RIGID	None	None	RIGID	Typical
15	M19	N48	N46	90	Connection Plate	Beam	None	Q345	Typical
16	M20	N11	N19		RIGID	None	None	RIGID	Typical
17	M21	N49	N47	90	Connection Plate	Beam	None	Q345	Typical
18	M22	N12	N20		RIGID	None	None	RIGID	Typical
19	M23	N44	N46		RIGID	None	None	RIGID	Typical
20	M25	N45	N47		RIGID	None	None	RIGID	Typical
21	M27	N43	N42	90	RIGID	None	None	RIGID	Typical
22	MP1	N31	N32		Mount Pipe	Beam	None	Q235-GB	Typical
23	M29	N40	N41		RIGID	None	None	RIGID	Typical
24	MP2	N25	N28		Mount Pipe	Beam	None	Q235-GB	Typical
25	SA1	N41	N38		Standoff	Beam	None	Q235-GB	Typical
26	MP3	N24	N27		Mount Pipe	Beam	None	Q235-GB	Typical
27	SA3	N40	N39		Standoff	Beam	None	Q235-GB	Typical
28	M35	N38	N36	90	Connection Plate	Beam	None	Q345	Typical
29	M36	N39	N37	90	Connection Plate	Beam	None	Q345	Typical
30	M37	N34	N36		RIGID	None	None	RIGID	Typical
31	M39	N35	N37		RIGID	None	None	RIGID	Typical
32	HOR2	N1	N2		Face Horizontal	Beam	None	Q235-GB	Typical
33	HOR1	N3	N4		Face Horizontal	Beam	None	Q235-GB	Typical
34	M43A	N69	N68		Bracing	Beam	None	Q345	Typical
35	M44A	N67	N66		Bracing	Beam	None	Q345	Typical
36	M41A	N67A	N69A		RIGID	None	None	RIGID	Typical
37	M78	N125	N126		RIGID	None	None	RIGID	Typical
38	M119	N188	N67B		RIGID	None	None	RIGID	Typical
39	TB3	N125	N188		Tieback	Beam	None	Q235-GB	Typical
40	SA12	N121	N97		Standoff	Beam	None	Q235-GB	Typical
41	M45	N113	N123		Bracing	Beam	None	Q345	Typical
42	M46	N112	N121		Bracing	Beam	None	Q345	Typical
43	M48	N115	N97		Bracing	Beam	None	Q345	Typical
44	M49	N116	N103		Bracing	Beam	None	Q345	Typical
45	M52	N121	N123		RIGID	None	None	RIGID	Typical
46	M53	N115	N116		RIGID	None	None	RIGID	Typical
47	M54	N93	N127		Bracing	Beam	None	Q345	Typical
48	M55	N122	N124	90	RIGID	None	None	RIGID	Typical
49	M56	N108	N101		Bracing	Beam	None	Q345	Typical
50	M60	N103	N120	90	Connection Plate	Beam	None	Q345	Typical
51	SA10	N123	N103		Standoff	Beam	None	Q235-GB	Typical
52	M64	N97	N94	90	Connection Plate	Beam	None	Q345	Typical
53	SA9	N116	N113		Standoff	Beam	None	Q235-GB	Typical
54	M66	N118	N120		RIGID	None	None	RIGID	Typical
55	M67	N82	N94		RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
56	M70	N117	N114	90	RIGID	None	None	RIGID	Typical
57	HOR6	N72	N74		Face Horizontal	Beam	None	Q235-GB	Typical
58	SA11	N115	N112		Standoff	Beam	None	Q235-GB	Typical
59	M75	N113	N105	90	Connection Plate	Beam	None	Q345	Typical
60	M76	N112	N111	90	Connection Plate	Beam	None	Q345	Typical
61	HOR5	N75	N78		Face Horizontal	Beam	None	Q235-GB	Typical
62	M79	N109	N105		RIGID	None	None	RIGID	Typical
63	M80	N110	N111		RIGID	None	None	RIGID	Typical
64	M81	N130	N81		Bracing	Beam	None	Q345	Typical
65	M82	N129	N128		Bracing	Beam	None	Q345	Typical
66	M83	N133	N132		RIGID	None	None	RIGID	Typical
67	SA8	N184	N160		Standoff	Beam	None	Q235-GB	Typical
68	M86	N176	N186		Bracing	Beam	None	Q345	Typical
69	M87	N175	N184		Bracing	Beam	None	Q345	Typical
70	M89	N178	N160		Bracing	Beam	None	Q345	Typical
71	M90	N179	N166		Bracing	Beam	None	Q345	Typical
72	M93	N184	N186		RIGID	None	None	RIGID	Typical
73	M94	N178	N179		RIGID	None	None	RIGID	Typical
74	M95	N156	N189		Bracing	Beam	None	Q345	Typical
75	M96	N185	N187	90	RIGID	None	None	RIGID	Typical
76	M97	N171	N164		Bracing	Beam	None	Q345	Typical
77	M101	N166	N183	90	Connection Plate	Beam	None	Q345	Typical
78	SA6	N186	N166		Standoff	Beam	None	Q235-GB	Typical
79	M105	N160	N157	90	Connection Plate	Beam	None	Q345	Typical
80	SA5	N179	N176		Standoff	Beam	None	Q235-GB	Typical
81	M107	N181	N183		RIGID	None	None	RIGID	Typical
82	M108	N145	N157		RIGID	None	None	RIGID	Typical
83	M110	N182	N193		RIGID	None	None	RIGID	Typical
84	M111	N180	N177	90	RIGID	None	None	RIGID	Typical
85	HOR4	N135	N137		Face Horizontal	Beam	None	Q235-GB	Typical
86	SA7	N178	N175		Standoff	Beam	None	Q235-GB	Typical
87	M116	N176	N168	90	Connection Plate	Beam	None	Q345	Typical
88	M117	N175	N174	90	Connection Plate	Beam	None	Q345	Typical
89	HOR3	N138	N141		Face Horizontal	Beam	None	Q235-GB	Typical
90	M120	N172	N168		RIGID	None	None	RIGID	Typical
91	M121	N173	N174		RIGID	None	None	RIGID	Typical
92	M123	N192	N144		Bracing	Beam	None	Q345	Typical
93	M124	N191	N190		Bracing	Beam	None	Q345	Typical
94	M125	N195	N194		RIGID	None	None	RIGID	Typical
95	TB1	N67A	N195		Tieback	Beam	None	Q235-GB	Typical
96	TB2	N182	N133		Tieback	Beam	None	Q235-GB	Typical
97	MP9	N230	N199		Mount Pipe	Beam	None	Q235-GB	Typical
98	M99	N165	N167		RIGID	None	None	RIGID	Typical
99	M100	N106	N162		RIGID	None	None	RIGID	Typical
100	MP8	N170	N163		Mount Pipe	Beam	None	Q235-GB	Typical
101	M103	N197	N198		RIGID	None	None	RIGID	Typical
102	M104	N196	N161		RIGID	None	None	RIGID	Typical
103	M106	N233	N235		RIGID	None	None	RIGID	Typical
104	M109	N232	N234		RIGID	None	None	RIGID	Typical
105	MP7	N236	N231		Mount Pipe	Beam	None	Q235-GB	Typical
106	MP6	N247	N246		Mount Pipe	Beam	None	Q235-GB	Typical
107	M114	N240	N241		RIGID	None	None	RIGID	Typical
108	M115	N169	N238		RIGID	None	None	RIGID	Typical
109	MP5	N242	N239		Mount Pipe	Beam	None	Q235-GB	Typical
110	M127	N244	N245		RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
111	M128	N243	N237		RIGID	None	None	RIGID	Typical
112	M130	N250	N252		RIGID	None	None	RIGID	Typical
113	M131	N249	N251		RIGID	None	None	RIGID	Typical
114	MP4	N253	N248		Mount Pipe	Beam	None	Q235-GB	Typical

Hot Rolled Steel Properties

	Label	E [psi]	G [psi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	2.9e+7	1.115e+7	0.3	0.65	0.49	50	1.1	65	1.1
2	Q345	2.9e+7	1.115e+7	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	2.9e+7	1.115e+7	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	2.9e+7	1.115e+7	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	2.9e+7	1.115e+7	0.3	0.65	0.527	46	1.4	58	1.3
6	Q235-GB	2.9e+7	1.115e+7	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	2.9e+7	1.115e+7	0.3	0.65	0.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Face Horizontal	PIPE_2.5	Beam	None	Q235-GB	Typical	1.61	1.45	1.45	2.89
2	Standoff	PIPE_2.0	Beam	None	Q235-GB	Typical	1.02	0.627	0.627	1.25
3	Bracing	0.625"S.R.	Beam	None	Q345	Typical	0.307	0.007	0.007	0.015
4	Mount Pipe	PIPE_2.0	Beam	None	Q235-GB	Typical	1.02	0.627	0.627	1.25
5	Conn. Plate	PL0.625X3.5	Beam	None	Q345	Typical	2.188	0.071	2.233	0.253
6	Pivot Plate	PL0.625X9.25	Beam	None	Q345	Typical	5.781	0.188	41.222	0.721
7	Connection Plate	PL3X5/8	Beam	None	Q345	Typical	1.875	0.061	1.406	0.212
8	Tieback	PIPE_2.0	Beam	None	Q235-GB	Typical	1.02	0.627	0.627	1.25

Node Coordinates

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
1	N1	-63	0	31.3	
2	N2	63	0	31.3	
3	N3	-63	40	31.3	
4	N4	63	40	31.3	
5	N11	-45	0	31.3	
6	N12	-45	40	31.3	
7	N13	0	0	31.3	
8	N14	0	40	31.3	
9	N15	45	0	31.3	
10	N16	45	40	31.3	
11	N19	-45	0	34.3	
12	N20	-45	40	34.3	
13	N21	0	0	34.3	
14	N22	0	40	34.3	
15	N24	-45	68	34.3	
16	N25	0	68	34.3	
17	N27	-45	-28	34.3	
18	N28	0	-28	34.3	
19	N29	45	0	34.3	
20	N30	45	40	34.3	
21	N31	45	68	34.3	
22	N32	45	-28	34.3	
23	N34	29.35	40	31.3	
24	N35	-29.35	40	31.3	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
25	N36	29.35	38.25	31.3	
26	N37	-29.35	38.25	31.3	
27	N38	29.35	38.25	26.8	
28	N39	-29.35	38.25	26.8	
29	N40	-7.05	38.25	4.5	
30	N41	7.05	38.25	4.5	
31	N42	0	38.25	4.5	
32	N43	0	38.25	-3.5	
33	N44	29.35	0	31.3	
34	N45	-29.35	0	31.3	
35	N46	29.35	-1.75	31.3	
36	N47	-29.35	-1.75	31.3	
37	N48	29.35	-1.75	26.8	
38	N49	-29.35	-1.75	26.8	
39	N50	-7.05	-1.75	4.5	
40	N51	7.05	-1.75	4.5	
41	N52	0	-1.75	4.5	
42	N53	0	-1.75	-3.5	
43	N62A	-27.935813	-1.75	25.385813	
44	N63A	-27.935813	38.25	25.385813	
45	N64A	-8.464214	-1.75	5.914214	
46	N65	-8.464214	38.25	5.914214	
47	N66	27.935813	-1.75	25.385813	
48	N67	27.935813	38.25	25.385813	
49	N68	8.464214	-1.75	5.914214	
50	N69	8.464214	38.25	5.914214	
51	N67A	-41.35	44	31.3	
52	N69A	-41.35	40	31.3	
53	CP	0	38.25	-15	
54	N67B	11.292641	38.25	8.742641	
55	N125	60.771976	44	-2.33985	
56	N126	60.771976	40	-2.33985	
57	N188	11.292641	41.25	8.742641	
58	N72	71.596976	0	16.4096	
59	N74	8.596976	0	-92.7096	
60	N75	71.596976	40	16.4096	
61	N78	8.596976	40	-92.7096	
62	N81	13.880133	-1.75	-32.787331	
63	N82	54.771976	0	-12.732154	
64	N93	22.344347	38.25	-18.126883	
65	N94	54.771976	-1.75	-12.732154	
66	N97	50.874862	-1.75	-10.482154	
67	N101	48.943047	-1.75	-10.999783	
68	N103	21.524862	-1.75	-61.317846	
69	N105	25.421976	38.25	-63.567846	
70	N106	40.096976	40	-38.15	
71	N108	48.943047	38.25	-10.999783	
72	N109	25.421976	40	-63.567846	
73	N110	54.771976	40	-12.732154	
74	N111	54.771976	38.25	-12.732154	
75	N112	50.874862	38.25	-10.482154	
76	N113	21.524862	38.25	-61.317846	
77	N114	16.887495	38.25	-24.75	
78	N115	20.412495	38.25	-18.644521	
79	N116	13.362495	38.25	-30.855479	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
80	N117	9.959292	38.25	-20.75	
81	N118	25.421976	0	-63.567846	
82	N120	25.421976	-1.75	-63.567846	
83	N121	20.412495	-1.75	-18.644521	
84	N122	9.959292	-1.75	-20.75	
85	N123	13.362495	-1.75	-30.855479	
86	N124	16.887495	-1.75	-24.75	
87	N127	22.344347	-1.75	-18.126883	
88	N128	21.007234	-1.75	-59.38603	
89	N129	21.007234	38.25	-59.38603	
90	N130	13.880133	38.25	-32.787331	
91	N132	14.91541	38.25	-36.651034	
92	N133	14.91541	41.25	-36.651034	
93	N135	-8.596976	0	-92.7096	
94	N137	-71.596976	0	16.4096	
95	N138	-8.596976	40	-92.7096	
96	N141	-71.596976	40	16.4096	
97	N144	-22.344347	-1.75	-18.126883	
98	N145	-25.421976	0	-63.567846	
99	N156	-13.880133	38.25	-32.787331	
100	N157	-25.421976	-1.75	-63.567846	
101	N160	-21.524862	-1.75	-61.317846	
102	N164	-21.007234	-1.75	-59.38603	
103	N166	-50.874862	-1.75	-10.482154	
104	N168	-54.771976	38.25	-12.732154	
105	N169	-40.096976	40	-38.15	
106	N171	-21.007234	38.25	-59.38603	
107	N172	-54.771976	40	-12.732154	
108	N173	-25.421976	40	-63.567846	
109	N174	-25.421976	38.25	-63.567846	
110	N175	-21.524862	38.25	-61.317846	
111	N176	-50.874862	38.25	-10.482154	
112	N177	-16.887495	38.25	-24.75	
113	N178	-13.362495	38.25	-30.855479	
114	N179	-20.412495	38.25	-18.644521	
115	N180	-9.959292	38.25	-20.75	
116	N181	-54.771976	0	-12.732154	
117	N182	-19.421976	44	-73.96015	
118	N183	-54.771976	-1.75	-12.732154	
119	N184	-13.362495	-1.75	-30.855479	
120	N185	-9.959292	-1.75	-20.75	
121	N186	-20.412495	-1.75	-18.644521	
122	N187	-16.887495	-1.75	-24.75	
123	N189	-13.880133	-1.75	-32.787331	
124	N190	-48.943047	-1.75	-10.999783	
125	N191	-48.943047	38.25	-10.999783	
126	N192	-22.344347	38.25	-18.126883	
127	N193	-19.421976	40	-73.96015	
128	N194	-26.20805	38.25	-17.091607	
129	N195	-26.20805	41.25	-17.091607	
130	N200	18.2	18.25	15.65	
131	N201	8.464214	0.786706	5.914214	
132	N202	27.935813	35.713342	25.385813	
133	N203	8.464214	35.713294	5.914214	
134	N204	27.935813	0.786658	25.385813	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
135	N205	-18.2	18.25	15.65	
136	N206	-8.464214	35.713294	5.914214	
137	N207	-27.935813	0.786658	25.385813	
138	N208	-8.464214	0.786706	5.914214	
139	N209	-27.935813	35.713342	25.385813	
140	N210	17.443679	18.25	-46.086662	
141	N211	13.880133	0.786706	-32.787331	
142	N212	21.007234	35.713342	-59.38603	
143	N213	35.643679	18.25	-14.563338	
144	N214	22.344347	0.786706	-18.126883	
145	N215	48.943047	35.713342	-10.999783	
146	N216	22.344347	35.713294	-18.126883	
147	N217	48.943047	0.786658	-10.999783	
148	N218	13.880133	35.713294	-32.787331	
149	N219	21.007234	0.786658	-59.38603	
150	N220	-35.643679	18.25	-14.563338	
151	N221	-22.344347	0.786706	-18.126883	
152	N222	-48.943047	35.713342	-10.999783	
153	N223	-17.443679	18.25	-46.086662	
154	N224	-13.880133	0.786706	-32.787331	
155	N225	-21.007234	35.713342	-59.38603	
156	N226	-13.880133	35.713294	-32.787331	
157	N227	-21.007234	0.786658	-59.38603	
158	N228	-22.344347	35.713294	-18.126883	
159	N229	-48.943047	0.786658	-10.999783	
160	N161	65.195052	40	-0.678857	
161	N162	42.695052	40	-39.65	
162	N163	42.695052	-28	-39.65	
163	N165	40.096976	0	-38.15	
164	N167	42.695052	0	-39.65	
165	N170	42.695052	68	-39.65	
166	N196	62.596976	40	0.821143	
167	N197	62.596976	0	0.821143	
168	N198	65.195052	0	-0.678857	
169	N199	65.195052	-28	-0.678857	
170	N230	65.195052	68	-0.678857	
171	N231	20.195052	-28	-78.621143	
172	N232	17.596976	0	-77.121143	
173	N233	17.596976	40	-77.121143	
174	N234	20.195052	0	-78.621143	
175	N235	20.195052	40	-78.621143	
176	N236	20.195052	68	-78.621143	
177	N237	-20.195052	40	-78.621143	
178	N238	-42.695052	40	-39.65	
179	N239	-42.695052	-28	-39.65	
180	N240	-40.096976	0	-38.15	
181	N241	-42.695052	0	-39.65	
182	N242	-42.695052	68	-39.65	
183	N243	-17.596976	40	-77.121143	
184	N244	-17.596976	0	-77.121143	
185	N245	-20.195052	0	-78.621143	
186	N246	-20.195052	-28	-78.621143	
187	N247	-20.195052	68	-78.621143	
188	N248	-65.195052	-28	-0.678857	
189	N249	-62.596976	0	0.821143	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
190	N250	-62.596976	40	0.821143	
191	N251	-65.195052	0	-0.678857	
192	N252	-65.195052	40	-0.678857	
193	N253	-65.195052	68	-0.678857	

Hot Rolled Steel Design Parameters

	Label	Shape	Length [in]	Lcomp top [in]	Channel Conn.	a [in]	Function
1	M3	Bracing	50.937	Lbyy	N/A	N/A	Lateral
2	M4	Bracing	50.937	Lbyy	N/A	N/A	Lateral
3	M5	Bracing	50.937	Lbyy	N/A	N/A	Lateral
4	M6	Bracing	50.937	Lbyy	N/A	N/A	Lateral
5	M9	Bracing	40	Lbyy	N/A	N/A	Lateral
6	M10	Bracing	40	Lbyy	N/A	N/A	Lateral
7	SA2	Standoff	31.537	Lbyy	N/A	N/A	Lateral
8	SA4	Standoff	31.537	Lbyy	N/A	N/A	Lateral
9	M19	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
10	M21	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
11	MP1	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
12	MP2	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
13	SA1	Standoff	31.537	Lbyy	N/A	N/A	Lateral
14	MP3	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
15	SA3	Standoff	31.537	Lbyy	N/A	N/A	Lateral
16	M35	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
17	M36	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
18	HOR2	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
19	HOR1	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
20	M43A	Bracing	40	Lbyy	N/A	N/A	Lateral
21	M44A	Bracing	40	Lbyy	N/A	N/A	Lateral
22	TB3	Tieback	50.78	Lbyy	N/A	N/A	Lateral
23	SA12	Standoff	31.537	Lbyy	N/A	N/A	Lateral
24	M45	Bracing	50.937	Lbyy	N/A	N/A	Lateral
25	M46	Bracing	50.937	Lbyy	N/A	N/A	Lateral
26	M48	Bracing	50.937	Lbyy	N/A	N/A	Lateral
27	M49	Bracing	50.937	Lbyy	N/A	N/A	Lateral
28	M54	Bracing	40	Lbyy	N/A	N/A	Lateral
29	M56	Bracing	40	Lbyy	N/A	N/A	Lateral
30	M60	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
31	SA10	Standoff	31.537	Lbyy	N/A	N/A	Lateral
32	M64	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
33	SA9	Standoff	31.537	Lbyy	N/A	N/A	Lateral
34	HOR6	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
35	SA11	Standoff	31.537	Lbyy	N/A	N/A	Lateral
36	M75	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
37	M76	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
38	HOR5	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
39	M81	Bracing	40	Lbyy	N/A	N/A	Lateral
40	M82	Bracing	40	Lbyy	N/A	N/A	Lateral
41	SA8	Standoff	31.537	Lbyy	N/A	N/A	Lateral
42	M86	Bracing	50.937	Lbyy	N/A	N/A	Lateral
43	M87	Bracing	50.937	Lbyy	N/A	N/A	Lateral
44	M89	Bracing	50.937	Lbyy	N/A	N/A	Lateral
45	M90	Bracing	50.937	Lbyy	N/A	N/A	Lateral
46	M95	Bracing	40	Lbyy	N/A	N/A	Lateral
47	M97	Bracing	40	Lbyy	N/A	N/A	Lateral
48	M101	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [in]	Lcomp top [in]	Channel Conn.	a [in]	Function
49	SA6	Standoff	31.537	Lbyy	N/A	N/A	Lateral
50	M105	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
51	SA5	Standoff	31.537	Lbyy	N/A	N/A	Lateral
52	HOR4	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
53	SA7	Standoff	31.537	Lbyy	N/A	N/A	Lateral
54	M116	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
55	M117	Connection Plate	4.5	Lbyy	N/A	N/A	Lateral
56	HOR3	Face Horizontal	126	Lbyy	N/A	N/A	Lateral
57	M123	Bracing	40	Lbyy	N/A	N/A	Lateral
58	M124	Bracing	40	Lbyy	N/A	N/A	Lateral
59	TB1	Tieback	50.78	Lbyy	N/A	N/A	Lateral
60	TB2	Tieback	50.78	Lbyy	N/A	N/A	Lateral
61	MP9	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
62	MP8	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
63	MP7	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
64	MP6	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
65	MP5	Mount Pipe	96	Lbyy	N/A	N/A	Lateral
66	MP4	Mount Pipe	96	Lbyy	N/A	N/A	Lateral

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[K]
1	General Members				
2	RIGID		48	228.6	0
3	Total General		48	228.6	0
4					
5	Hot Rolled Steel				
6	Q235-GB	PIPE_2.0	24	1394.8	0.403
7	Q235-GB	PIPE_2.5	6	756	0.345
8	Q345	0.625"S.R.	24	899.2	0.078
9	Q345	PL3X5/8	12	54	0.029
10	Total HR Steel		66	3104	0.856

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed
1	Self Weight	DL		-1			36	
2	Wind Load AZI 0	WLZ					72	
3	Wind Load AZI 30	None					72	
4	Wind Load AZI 60	None					72	
5	Wind Load AZI 90	WLX					72	
6	Wind Load AZI 120	None					72	
7	Wind Load AZI 150	None					72	
8	Wind Load AZI 180	None					72	
9	Wind Load AZI 210	None					72	
10	Wind Load AZI 240	None					72	
11	Wind Load AZI 270	None					72	
12	Wind Load AZI 300	None					72	
13	Wind Load AZI 330	None					72	
14	Distr. Wind Load Z	WLZ						114
15	Distr. Wind Load X	WLX						114
16	Ice Weight	OL1					36	114
17	Ice Wind Load AZI 0	OL2					72	
18	Ice Wind Load AZI 30	None					72	
19	Ice Wind Load AZI 60	None					72	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed
20	Ice Wind Load AZI 90	OL3					72	
21	Ice Wind Load AZI 120	None					72	
22	Ice Wind Load AZI 150	None					72	
23	Ice Wind Load AZI 180	None					72	
24	Ice Wind Load AZI 210	None					72	
25	Ice Wind Load AZI 240	None					72	
26	Ice Wind Load AZI 270	None					72	
27	Ice Wind Load AZI 300	None					72	
28	Ice Wind Load AZI 330	None					72	
29	Distr. Ice Wind Load Z	OL2						114
30	Distr. Ice Wind Load X	OL3						114
31	Seismic Load Z	ELZ			-0.318		36	
32	Seismic Load X	ELX	-0.318				36	
33	Service Live Loads	LL				1		
34	Maintenance Load 1	LL				1		
35	Maintenance Load 2	LL				1		
36	Maintenance Load 3	LL				1		
37	Maintenance Load 4	LL				1		
38	Maintenance Load 5	LL				1		
39	Maintenance Load 6	LL				1		
40	Maintenance Load 7	LL				1		
41	Maintenance Load 8	LL				1		
42	Maintenance Load 9	LL				1		

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4DL	Yes	Y	1	1.4								
2	1.2DL + 1WL AZI 0	Yes	Y	1	1.2	2	1	14	1	15			
3	1.2DL + 1WL AZI 30	Yes	Y	1	1.2	3	1	14	0.866	15	0.5		
4	1.2DL + 1WL AZI 60	Yes	Y	1	1.2	4	1	14	0.5	15	0.866		
5	1.2DL + 1WL AZI 90	Yes	Y	1	1.2	5	1	14		15	1		
6	1.2DL + 1WL AZI 120	Yes	Y	1	1.2	6	1	14	-0.5	15	0.866		
7	1.2DL + 1WL AZI 150	Yes	Y	1	1.2	7	1	14	-0.866	15	0.5		
8	1.2DL + 1WL AZI 180	Yes	Y	1	1.2	8	1	14	-1	15			
9	1.2DL + 1WL AZI 210	Yes	Y	1	1.2	9	1	14	-0.866	15	-0.5		
10	1.2DL + 1WL AZI 240	Yes	Y	1	1.2	10	1	14	-0.5	15	-0.866		
11	1.2DL + 1WL AZI 270	Yes	Y	1	1.2	11	1	14		15	-1		
12	1.2DL + 1WL AZI 300	Yes	Y	1	1.2	12	1	14	0.5	15	-0.866		
13	1.2DL + 1WL AZI 330	Yes	Y	1	1.2	13	1	14	0.866	15	-0.5		
14	0.9DL + 1WL AZI 0	Yes	Y	1	0.9	2	1	14	1	15			
15	0.9DL + 1WL AZI 30	Yes	Y	1	0.9	3	1	14	0.866	15	0.5		
16	0.9DL + 1WL AZI 60	Yes	Y	1	0.9	4	1	14	0.5	15	0.866		
17	0.9DL + 1WL AZI 90	Yes	Y	1	0.9	5	1	14		15	1		
18	0.9DL + 1WL AZI 120	Yes	Y	1	0.9	6	1	14	-0.5	15	0.866		
19	0.9DL + 1WL AZI 150	Yes	Y	1	0.9	7	1	14	-0.866	15	0.5		
20	0.9DL + 1WL AZI 180	Yes	Y	1	0.9	8	1	14	-1	15			
21	0.9DL + 1WL AZI 210	Yes	Y	1	0.9	9	1	14	-0.866	15	-0.5		
22	0.9DL + 1WL AZI 240	Yes	Y	1	0.9	10	1	14	-0.5	15	-0.866		
23	0.9DL + 1WL AZI 270	Yes	Y	1	0.9	11	1	14		15	-1		
24	0.9DL + 1WL AZI 300	Yes	Y	1	0.9	12	1	14	0.5	15	-0.866		
25	0.9DL + 1WL AZI 330	Yes	Y	1	0.9	13	1	14	0.866	15	-0.5		
26	1.2D + 1.0Di	Yes	Y	1	1.2	16	1						
27	1.2D + 1.0Di +1.0Wi AZI 0	Yes	Y	1	1.2	16	1	17	1	29	1	30	
28	1.2D + 1.0Di +1.0Wi AZI 30	Yes	Y	1	1.2	16	1	18	1	29	0.866	30	0.5
29	1.2D + 1.0Di +1.0Wi AZI 60	Yes	Y	1	1.2	16	1	19	1	29	0.5	30	0.866

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
30	1.2D + 1.0Di +1.0Wi AZI 90	Yes	Y	1	1.2	16	1	20	1	29		30	1
31	1.2D + 1.0Di +1.0Wi AZI 120	Yes	Y	1	1.2	16	1	21	1	29	-0.5	30	0.866
32	1.2D + 1.0Di +1.0Wi AZI 150	Yes	Y	1	1.2	16	1	22	1	29	-0.866	30	0.5
33	1.2D + 1.0Di +1.0Wi AZI 180	Yes	Y	1	1.2	16	1	23	1	29	-1	30	
34	1.2D + 1.0Di +1.0Wi AZI 210	Yes	Y	1	1.2	16	1	24	1	29	-0.866	30	-0.5
35	1.2D + 1.0Di +1.0Wi AZI 240	Yes	Y	1	1.2	16	1	25	1	29	-0.5	30	-0.866
36	1.2D + 1.0Di +1.0Wi AZI 270	Yes	Y	1	1.2	16	1	26	1	29		30	-1
37	1.2D + 1.0Di +1.0Wi AZI 300	Yes	Y	1	1.2	16	1	27	1	29	0.5	30	-0.866
38	1.2D + 1.0Di +1.0Wi AZI 330	Yes	Y	1	1.2	16	1	28	1	29	0.866	30	-0.5
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.242	31	1	32					
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.242	31	0.866	32	0.5				
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.242	31	0.5	32	0.866				
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.242	31		32	1				
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.242	31	-0.5	32	0.866				
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.242	31	-0.866	32	0.5				
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.242	31	-1	32					
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.242	31	-0.866	32	-0.5				
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.242	31	-0.5	32	-0.866				
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.242	31		32	-1				
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.242	31	0.5	32	-0.866				
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.242	31	0.866	32	-0.5				
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.858	31	1	32					
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.858	31	0.866	32	0.5				
53	(0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.858	31	0.5	32	0.866				
54	(0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.858	31		32	1				
55	(0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.858	31	-0.5	32	0.866				
56	(0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.858	31	-0.866	32	0.5				
57	(0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.858	31	-1	32					
58	(0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.858	31	-0.866	32	-0.5				
59	(0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.858	31	-0.5	32	-0.866				
60	(0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.858	31		32	-1				
61	(0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.858	31	0.5	32	-0.866				
62	(0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.858	31	0.866	32	-0.5				
63	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 0	Yes	Y	1	1	2	0.246	14	0.246	15		33	1.5
64	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 30	Yes	Y	1	1	3	0.246	14	0.213	15	0.123	33	1.5
65	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 60	Yes	Y	1	1	4	0.246	14	0.123	15	0.213	33	1.5
66	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 90	Yes	Y	1	1	5	0.246	14		15	0.246	33	1.5
67	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 120	Yes	Y	1	1	6	0.246	14	-0.123	15	0.213	33	1.5
68	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 150	Yes	Y	1	1	7	0.246	14	-0.213	15	0.123	33	1.5
69	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 180	Yes	Y	1	1	8	0.246	14	-0.246	15		33	1.5
70	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 210	Yes	Y	1	1	9	0.246	14	-0.213	15	-0.123	33	1.5
71	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 240	Yes	Y	1	1	10	0.246	14	-0.123	15	-0.213	33	1.5
72	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 270	Yes	Y	1	1	11	0.246	14		15	-0.246	33	1.5
73	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 300	Yes	Y	1	1	12	0.246	14	0.123	15	-0.213	33	1.5
74	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 330	Yes	Y	1	1	13	0.246	14	0.213	15	-0.123	33	1.5
75	1.2DL + 1.5LL	Yes	Y	1	1.2	33	1.5						
76	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.061	14	0.061	15	
77	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.061	14	0.053	15	0.031
78	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.061	14	0.031	15	0.053
79	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.061	14		15	0.061
80	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.061	14	-0.031	15	0.053
81	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.061	14	-0.053	15	0.031
82	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.061	14	-0.061	15	
83	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.061	14	-0.053	15	-0.031
84	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.061	14	-0.031	15	-0.053

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
85	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.061	14		15	-0.061
86	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.061	14	0.031	15	-0.053
87	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.061	14	0.053	15	-0.031
88	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.061	14	0.061	15	
89	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.061	14	0.053	15	0.031
90	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.061	14	0.031	15	0.053
91	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.061	14		15	0.061
92	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.061	14	-0.031	15	0.053
93	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.061	14	-0.053	15	0.031
94	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.061	14	-0.061	15	
95	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.061	14	-0.053	15	-0.031
96	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.061	14	-0.031	15	-0.053
97	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.061	14		15	-0.061
98	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.061	14	0.031	15	-0.053
99	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.061	14	0.053	15	-0.031
100	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.061	14	0.061	15	
101	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.061	14	0.053	15	0.031
102	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.061	14	0.031	15	0.053
103	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.061	14		15	0.061
104	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.061	14	-0.031	15	0.053
105	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.061	14	-0.053	15	0.031
106	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.061	14	-0.061	15	
107	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.061	14	-0.053	15	-0.031
108	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.061	14	-0.031	15	-0.053
109	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.061	14		15	-0.061
110	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.061	14	0.031	15	-0.053
111	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.061	14	0.053	15	-0.031
112	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.061	14	0.061	15	
113	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.061	14	0.053	15	0.031
114	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.061	14	0.031	15	0.053
115	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.061	14		15	0.061
116	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.061	14	-0.031	15	0.053
117	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.061	14	-0.053	15	0.031
118	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.061	14	-0.061	15	
119	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.061	14	-0.053	15	-0.031
120	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.061	14	-0.031	15	-0.053
121	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.061	14		15	-0.061
122	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.061	14	0.031	15	-0.053
123	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.061	14	0.053	15	-0.031
124	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.061	14	0.061	15	
125	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.061	14	0.053	15	0.031
126	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.061	14	0.031	15	0.053
127	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.061	14		15	0.061
128	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.061	14	-0.031	15	0.053
129	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.061	14	-0.053	15	0.031
130	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.061	14	-0.061	15	
131	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.061	14	-0.053	15	-0.031
132	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.061	14	-0.031	15	-0.053
133	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.061	14		15	-0.061
134	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.061	14	0.031	15	-0.053
135	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.061	14	0.053	15	-0.031
136	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.061	14	0.061	15	
137	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.061	14	0.053	15	0.031
138	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.061	14	0.031	15	0.053
139	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.061	14		15	0.061

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
140	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.061	14	-0.031	15	0.053
141	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.061	14	-0.053	15	0.031
142	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.061	14	-0.061	15	
143	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.061	14	-0.053	15	-0.031
144	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.061	14	-0.031	15	-0.053
145	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.061	14		15	-0.061
146	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.061	14	0.031	15	-0.053
147	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.061	14	0.053	15	-0.031
148	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	40	1.5	2	0.061	14	0.061	15	
149	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	40	1.5	3	0.061	14	0.053	15	0.031
150	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	40	1.5	4	0.061	14	0.031	15	0.053
151	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	40	1.5	5	0.061	14		15	0.061
152	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	40	1.5	6	0.061	14	-0.031	15	0.053
153	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	40	1.5	7	0.061	14	-0.053	15	0.031
154	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	40	1.5	8	0.061	14	-0.061	15	
155	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	40	1.5	9	0.061	14	-0.053	15	-0.031
156	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	40	1.5	10	0.061	14	-0.031	15	-0.053
157	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	40	1.5	11	0.061	14		15	-0.061
158	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	40	1.5	12	0.061	14	0.031	15	-0.053
159	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	40	1.5	13	0.061	14	0.053	15	-0.031
160	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	41	1.5	2	0.061	14	0.061	15	
161	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	41	1.5	3	0.061	14	0.053	15	0.031
162	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	41	1.5	4	0.061	14	0.031	15	0.053
163	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	41	1.5	5	0.061	14		15	0.061
164	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	41	1.5	6	0.061	14	-0.031	15	0.053
165	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	41	1.5	7	0.061	14	-0.053	15	0.031
166	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	41	1.5	8	0.061	14	-0.061	15	
167	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	41	1.5	9	0.061	14	-0.053	15	-0.031
168	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	41	1.5	10	0.061	14	-0.031	15	-0.053
169	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	41	1.5	11	0.061	14		15	-0.061
170	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	41	1.5	12	0.061	14	0.031	15	-0.053
171	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	41	1.5	13	0.061	14	0.053	15	-0.031
172	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	42	1.5	2	0.061	14	0.061	15	
173	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	42	1.5	3	0.061	14	0.053	15	0.031
174	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	42	1.5	4	0.061	14	0.031	15	0.053
175	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	42	1.5	5	0.061	14		15	0.061
176	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	42	1.5	6	0.061	14	-0.031	15	0.053
177	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	42	1.5	7	0.061	14	-0.053	15	0.031
178	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	42	1.5	8	0.061	14	-0.061	15	
179	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	42	1.5	9	0.061	14	-0.053	15	-0.031
180	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	42	1.5	10	0.061	14	-0.031	15	-0.053
181	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	42	1.5	11	0.061	14		15	-0.061
182	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	42	1.5	12	0.061	14	0.031	15	-0.053

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N43	max	2060.613	7	2026.564	34	2107.442	25	-131.421	16	0	182	622.328	79
2		min	-1820.625	25	314.227	16	-3325.619	7	-1435.772	35	0	1	-766.422	109
3	N53	max	551.311	79	599.946	1	1482.55	27	35.807	19	0	182	222.105	16
4		min	-818.311	109	-31.383	19	-140.386	20	-414.283	1	0	1	-263.462	21
5	N117	max	2989.146	17	2025.201	38	1126.153	139	1061.771	142	0	182	1370.541	27
6		min	-4163.864	11	331.726	54	-385.45	23	-134.253	15	0	1	66.582	20
7	N122	max	1526.351	116	599.946	1	350.876	25	374.105	8	0	182	389.438	1
8		min	-25.868	24	-37.984	23	-1124.6	141	-87.634	25	0	1	-120.592	23
9	N180	max	1713.976	3	2021.563	31	3086.382	3	1230.656	153	0	182	-176.06	21

Envelope Node Reactions (Continued)

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
10		min	-771.138	21	331.724	58	-2266.196	21	-104.669	25	0	1	-1218.674	182
11	N185	max	305.528	17	599.944	1	24.802	15	265.073	67	0	182	42.447	17
12		min	-1404.378	181	-21.466	17	-1346.004	155	-155.371	24	0	1	-431.976	171
13	Totals:	max	4664.981	5	6115.023	33	4850.561	14						
14		min	-4664.97	23	2232.504	51	-4850.555	20						

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	M76	PL3X5/8	0.625	4.5	5	0.185	0	y	11	58792.715	60750	791.016	3796.875	1.557	H1-1b
2	M36	PL3X5/8	0.601	4.5	13	0.179	0	y	7	58792.715	60750	791.016	3796.875	1.535	H1-1b
3	M117	PL3X5/8	0.551	4.5	9	0.166	0	y	3	58792.715	60750	791.016	3796.875	1.522	H1-1b
4	M56	0.625"S.R.	0.473	30	5	0.02	30		5	1757.096	9946.8	96.768	96.768	1	H1-1a
5	M10	0.625"S.R.	0.469	30	13	0.018	30		13	1757.096	9946.8	96.768	96.768	1	H1-1a
6	HOR5	PIPE_2.5	0.46	32.813	17	0.215	32.813		5	20573.263	50715	3596.25	3596.25	1	H1-1b
7	M97	0.625"S.R.	0.452	30	155	0.016	30		9	1757.096	9946.8	96.768	96.768	1	H1-1a
8	HOR1	PIPE_2.5	0.429	32.813	25	0.2	32.813		13	20573.263	50715	3596.25	3596.25	1	H1-1b
9	M44A	0.625"S.R.	0.387	30	76	0.014	30		13	1757.096	9946.8	96.768	96.768	1	H1-1a
10	M82	0.625"S.R.	0.387	30	141	0.016	30		5	1757.096	9946.8	96.768	96.768	1	H1-1a
11	M124	0.625"S.R.	0.386	30	181	0.013	30		9	1757.096	9946.8	96.768	96.768	1	H1-1a
12	HOR3	PIPE_2.5	0.385	32.813	21	0.182	32.813		9	20573.263	50715	3596.25	3596.25	1	H1-1b
13	M75	PL3X5/8	0.356	4.5	6	0.112	0	y	12	58792.715	60750	791.016	3796.875	1.269	H1-1b
14	M35	PL3X5/8	0.356	4.5	2	0.112	4.5	y	8	58792.715	60750	791.016	3796.875	1.277	H1-1b
15	MP9	PIPE_2.0	0.328	28	11	0.127	28		11	14916.096	32130	1871.625	1871.625	1	H1-1b
16	MP3	PIPE_2.0	0.328	28	7	0.117	28		7	14916.096	32130	1871.625	1871.625	1	H1-1b
17	M116	PL3X5/8	0.319	4.5	10	0.097	4.5	y	4	58792.715	60750	791.016	3796.875	1.306	H1-1b
18	MP6	PIPE_2.0	0.301	28	3	0.106	28		3	14916.096	32130	1871.625	1871.625	1	H1-1b
19	SA9	PIPE_2.0	0.294	6.242	11	0.236	2.3		12	29576.459	32130	1871.625	1871.625	1	H1-1b
20	SA1	PIPE_2.0	0.278	5.913	5	0.263	5.913		11	29576.459	32130	1871.625	1871.625	1	H1-1b
21	SA3	PIPE_2.0	0.264	2.3	11	0.099	1.971		11	29576.459	32130	1871.625	1871.625	1	H1-1b
22	MP7	PIPE_2.0	0.246	28	12	0.036	28		13	14916.096	32130	1871.625	1871.625	1	H1-1b
23	SA7	PIPE_2.0	0.243	2.3	7	0.089	1.971		7	29576.459	32130	1871.625	1871.625	1	H1-1b
24	SA11	PIPE_2.0	0.241	2.3	12	0.086	29.566		115	29576.459	32130	1871.625	1871.625	1	H1-1b
25	MP1	PIPE_2.0	0.239	28	8	0.035	28		72	14916.096	32130	1871.625	1871.625	1	H1-1b
26	SA5	PIPE_2.0	0.232	5.913	13	0.236	5.913		7	29576.459	32130	1871.625	1871.625	1	H1-1b
27	MP4	PIPE_2.0	0.231	28	5	0.039	28		5	14916.096	32130	1871.625	1871.625	1	H1-1b
28	M21	PL3X5/8	0.226	4.5	8	0.178	4.5	y	105	58792.715	60750	791.016	3796.875	1.311	H1-1b
29	M64	PL3X5/8	0.225	4.5	12	0.178	4.5	y	121	58792.715	60750	791.016	3796.875	1.301	H1-1b
30	MP8	PIPE_2.0	0.22	28	11	0.066	28		2	14916.096	32130	1871.625	1871.625	1	H1-1b
31	MP2	PIPE_2.0	0.216	28	7	0.06	28		10	14916.096	32130	1871.625	1871.625	1	H1-1b
32	M105	PL3X5/8	0.214	4.5	153	0.177	4.5	y	149	58792.715	60750	791.016	3796.875	1.79	H1-1b
33	MP5	PIPE_2.0	0.213	28	12	0.067	28		6	14916.096	32130	1871.625	1871.625	1	H1-1b
34	M89	0.625"S.R.	0.2	0.468	152	0.601	0		7	783.122	9946.8	96.768	96.768	1	H1-1b*
35	M48	0.625"S.R.	0.2	0.468	112	0.553	0		12	783.122	9946.8	96.768	96.768	1	H1-1b*
36	M5	0.625"S.R.	0.2	0.468	108	0.67	0		11	783.122	9946.8	96.768	96.768	1	H1-1b*
37	M101	PL3X5/8	0.187	4.5	182	0.156	0	y	173	58792.715	60750	791.016	3796.875	1.832	H1-1b
38	M60	PL3X5/8	0.187	4.5	142	0.156	0	y	145	58792.715	60750	791.016	3796.875	1.831	H1-1b
39	M19	PL3X5/8	0.186	4.5	78	0.156	4.5	y	82	58792.715	60750	791.016	3796.875	1.822	H1-1b
40	M90	0.625"S.R.	0.174	0.468	182	0.253	0		9	783.122	9946.8	96.768	96.768	1	H1-1b*
41	M49	0.625"S.R.	0.174	0.468	142	0.34	0		5	783.122	9946.8	96.768	96.768	1	H1-1b*
42	M4	0.625"S.R.	0.174	0.468	79	0.296	0		13	783.122	9946.8	96.768	96.768	1	H1-1b*
43	HOR2	PIPE_2.5	0.15	108.938	75	0.073	32.813		9	20573.263	50715	3596.25	3596.25	1	H1-1b
44	HOR4	PIPE_2.5	0.136	32.813	153	0.079	32.813		5	20573.263	50715	3596.25	3596.25	1	H1-1b
45	HOR6	PIPE_2.5	0.136	32.813	113	0.076	32.813		13	20573.263	50715	3596.25	3596.25	1	H1-1b
46	SA12	PIPE_2.0	0.102	29.237	5	0.04	29.566		130	29576.459	32130	1871.625	1871.625	1	H1-1b
47	SA4	PIPE_2.0	0.101	29.237	13	0.04	29.237		7	29576.459	32130	1871.625	1871.625	1	H1-1b

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
48	SA8	PIPE_2.0	0.092	29.237	3	0.04	29.566		170	29576.459	32130	1871.625	1871.625	1	H1-1b
49	SA2	PIPE_2.0	0.062	29.237	2	0.036	29.237		94	29576.459	32130	1871.625	1871.625	1	H1-1b
50	SA10	PIPE_2.0	0.061	29.237	12	0.036	29.237		135	29576.459	32130	1871.625	1871.625	1	H1-1b
51	SA6	PIPE_2.0	0.057	29.237	4	0.035	29.237		163	29576.459	32130	1871.625	1871.625	1	H1-1b
52	TB3	PIPE_2.0	0.056	0	23	0.041	50.78		5	25921.943	32130	1871.625	1871.625	1	H1-1b*
53	TB2	PIPE_2.0	0.051	50.78	12	0.036	50.78		9	25921.943	32130	1871.625	1871.625	1	H1-1b*
54	M46	0.625"S.R.	0.05	0	23	0.344	0		8	783.122	9946.8	96.768	96.768	1	H1-1b*
55	TB1	PIPE_2.0	0.049	0	19	0.038	50.78		13	25921.943	32130	1871.625	1871.625	1	H1-1b*
56	M6	0.625"S.R.	0.045	0	19	0.329	0		5	783.122	9946.8	96.768	96.768	1	H1-1b*
57	M87	0.625"S.R.	0.038	0	15	0.351	0		13	783.122	9946.8	96.768	96.768	1	H1-1b*
58	M43A	0.625"S.R.	0.035	30	2	0.027	30		11	1757.096	9946.8	96.768	96.768	1	H1-1b
59	M95	0.625"S.R.	0.029	30	7	0.024	30		7	1757.096	9946.8	96.768	96.768	1	H1-1b
60	M9	0.625"S.R.	0.028	30	11	0.023	30		11	1757.096	9946.8	96.768	96.768	1	H1-1b
61	M81	0.625"S.R.	0.027	30	8	0.026	30		2	1757.096	9946.8	96.768	96.768	1	H1-1b
62	M54	0.625"S.R.	0.024	15.938	2	0.023	0		2	1757.096	9946.8	96.768	96.768	1	H1-1b
63	M123	0.625"S.R.	0.023	30	4	0.028	0		7	1757.096	9946.8	96.768	96.768	1	H1-1b
64	M3	0.625"S.R.	0.017	0	20	0.375	0		13	783.122	9946.8	96.768	96.768	1	H1-1b*
65	M45	0.625"S.R.	0.016	0	24	0.43	0		5	783.122	9946.8	96.768	96.768	1	H1-1b*
66	M86	0.625"S.R.	0.014	0	16	0.321	0		9	783.122	9946.8	96.768	96.768	1	H1-1b*

Envelope AISI S100-16: LRFD Member Cold Formed Steel Code Checks

No Data to Print...

APPENDIX D

ADDITIONAL CALCUATIONS

INFINIGY

Bolt Calculation Tool, V1.6.2

PROJECT DATA	
Site Name:	EAST HAVEN SOUTH
Site Number:	842862
Connection Description:	Mount to Tower

ENVELOPE BOLT LOADS		
(LC121 M70) Bolt Tension:	977.97	lbs
(LC36 M70) Bolt Shear:	1673.67	lbs

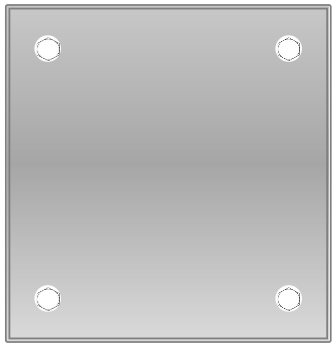
MAX BOLT USAGE LOADS[1]		
Bolt Tension:	301.18	lbs
Bolt Shear:	1673.67	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.625	in
Bolt Grade:	A325	-
# of Bolts:	4	-
Threads Excluded?	No	-

[1] *Max bolt usage loads correspond to Load combination #36 on member M70 in RISA-3D, which causes the maximum demand on the bolts.*

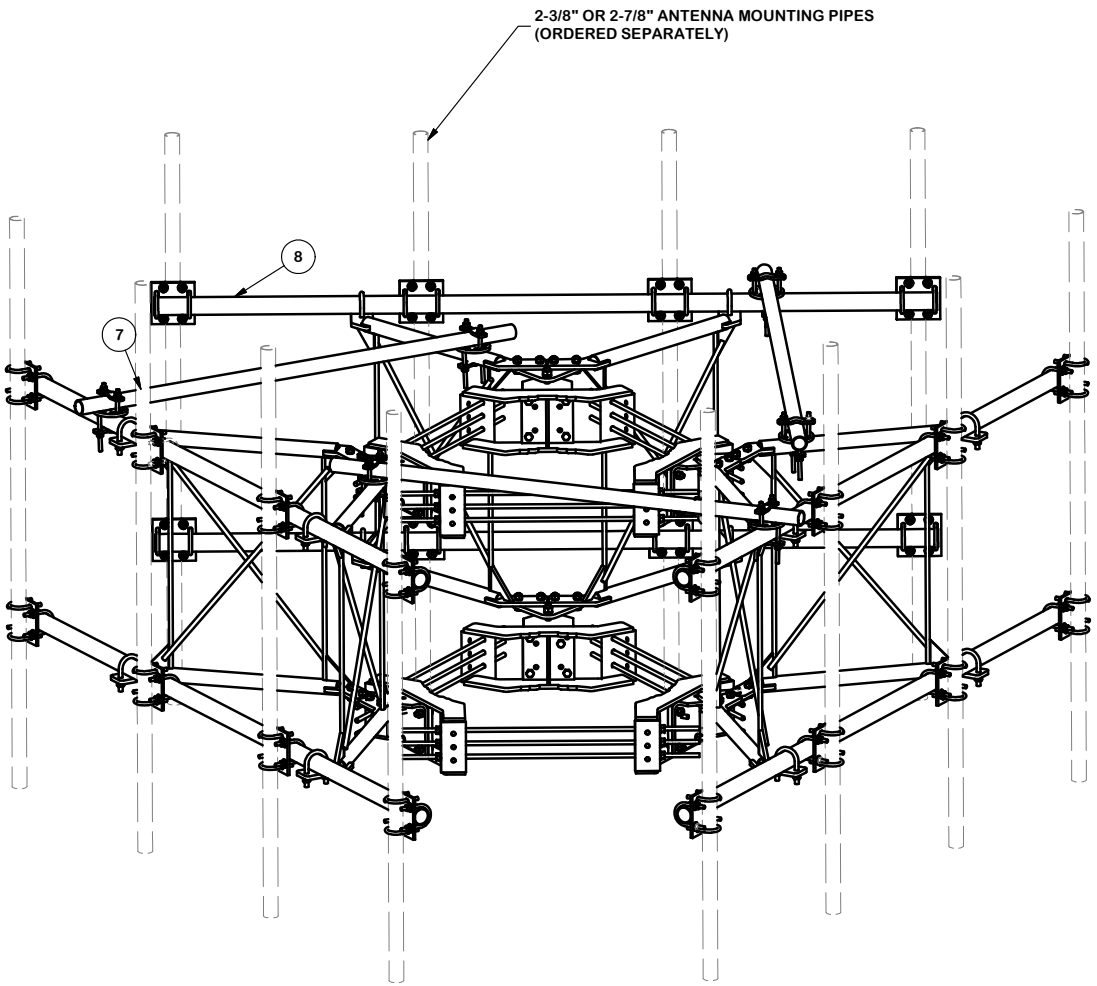
Member Information
I nodes of M11, M27, M55, M70, M96, M111,

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Max Tensile Usage	4.8%	
Max Shear Usage	12.1%	
Interaction Check (Max Usage)	0.01	***≤1.05***
Result	Pass	



APPENDIX E

MOUNT MODIFICATION DESIGN DRAWINGS (MDD) / SUPPLEMENTAL DRAWINGS



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-RMBPTC	RING MOUNT BENT PLATE TOP CONNECTION	13 in	14.80	44.41
3	3	X-RMBPBC	RING MOUNT BENT PLATE BOTTOM CONNECTION	12 in	14.80	44.41
4	6	X-VFAPL3	VFA-HD PIVOT PLATE	24 in	9.69	58.15
5	6	X-VFAW	SUPPORT ARM		66.80	400.78
6	24	SCX2	CROSSOVER PLATE	7 in	4.80	115.11
7	3	P284	2-3/8" X 84" SCH 40 GALVANIZED PIPE	84 in	26.91	80.74
8	6	P30126	2-7/8" O.D. X 126" SCH. 40 PIPE	126 in	76.94	461.62
9	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.48	14.90
10	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.91	10.95
11	6	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	2.87
12	6	G34LW	3/4" HDG LOCKWASHER		0.04	0.26
13	6	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	1.27
14	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	0.40	7.18
15	12	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	13.79
16	24	A582112	5/8" x 2-1/2" HDG A325 HEX BOLT	2 1/2 in	0.33	8.02
17	24	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	7.50
18	108	G58LW	5/8" HDG LOCKWASHER		0.03	2.82
19	108	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	14.03
20	48	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.26	12.34
21	96	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	70.91
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
23	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
24	216	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	7.36
25	216	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.00
26	216	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	15.47
					TOTAL WT. #	1904.67

ANT 15996

TOLERANCE NOTES

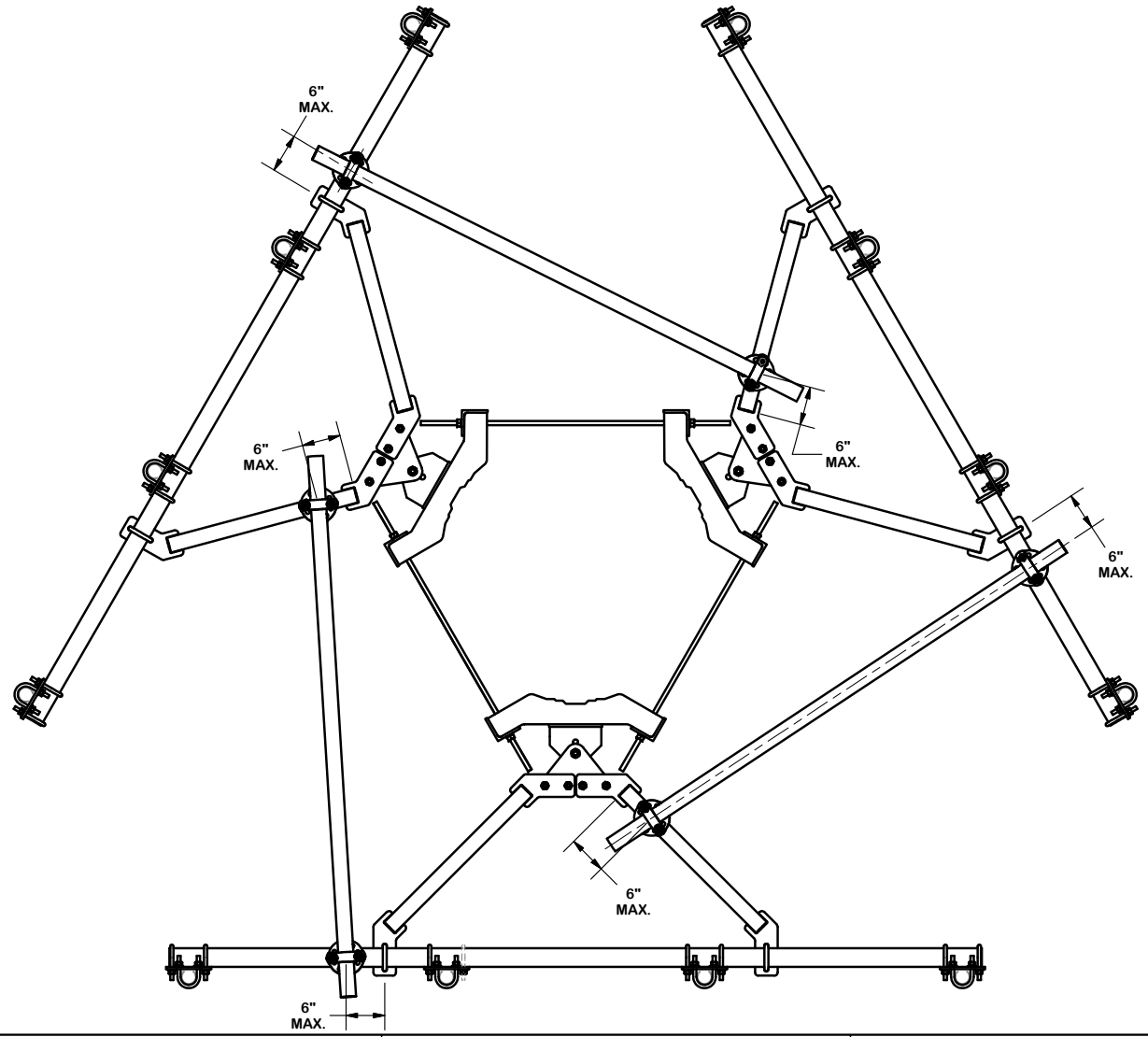
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
THREE SECTOR HEAVY 10 FRAME
AND MONOPOLE ATTACHMENT HARDWARE
NO MOUNTING PIPES

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 9/15/2016		VFA10-HD3L4NP

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP



ANT 15996

TOLERANCE NOTES

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CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP

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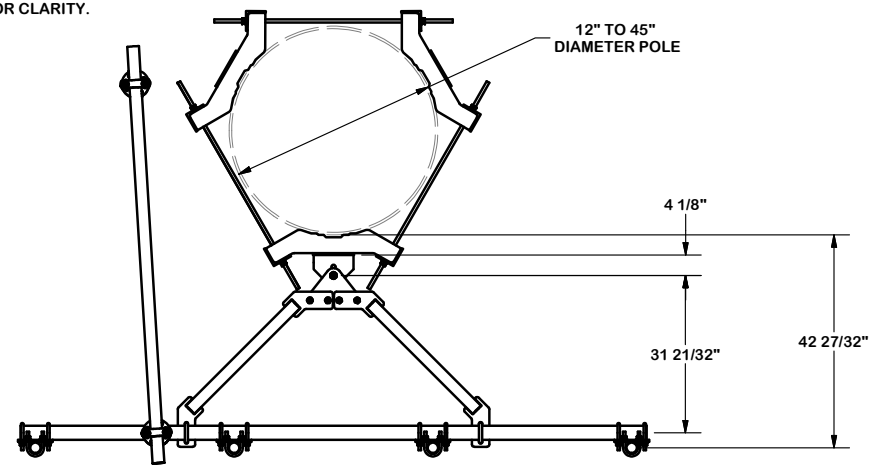
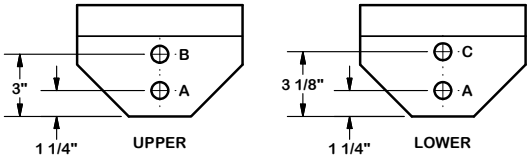
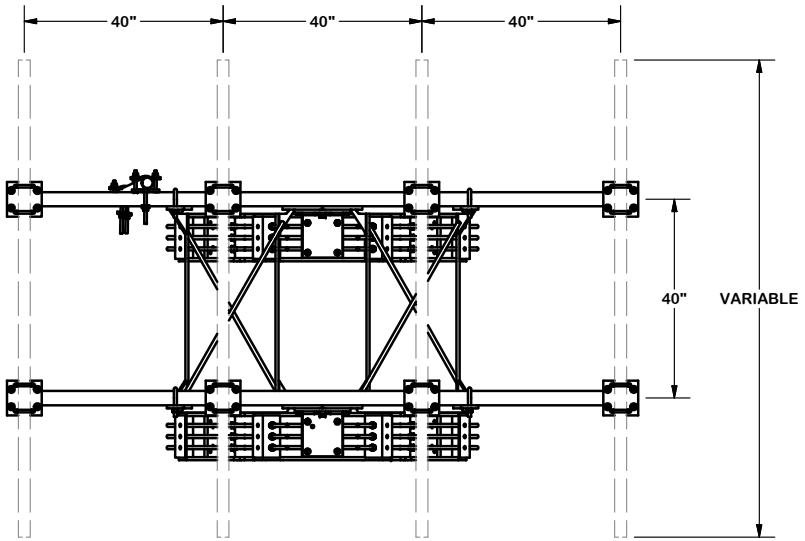
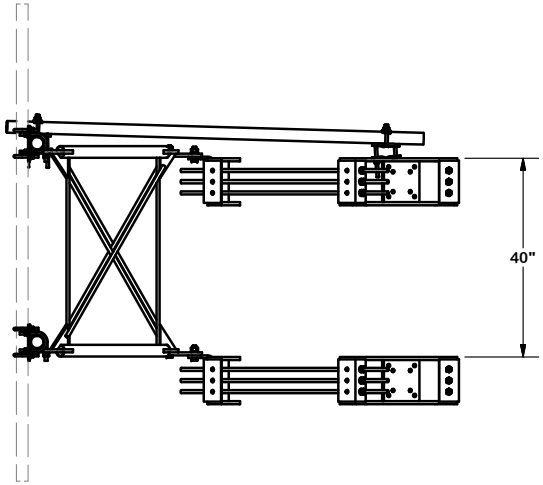




NOTES:

1. USE HOLE "A" IN UPPER AND LOWER BRACKETS FOR STRAIGHT LEGS.
2. USE HOLE "A" IN UPPER BRACKET AND HOLE "C" IN LOWER BRACKET FOR 3°.
3. USE HOLE "B" IN UPPER BRACKET AND HOLE "C" IN LOWER BRACKET FOR 0.2°.





ANT 15996

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	CEK 9/15/2016		VFA10-HD3L4NP

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP

NOTE:
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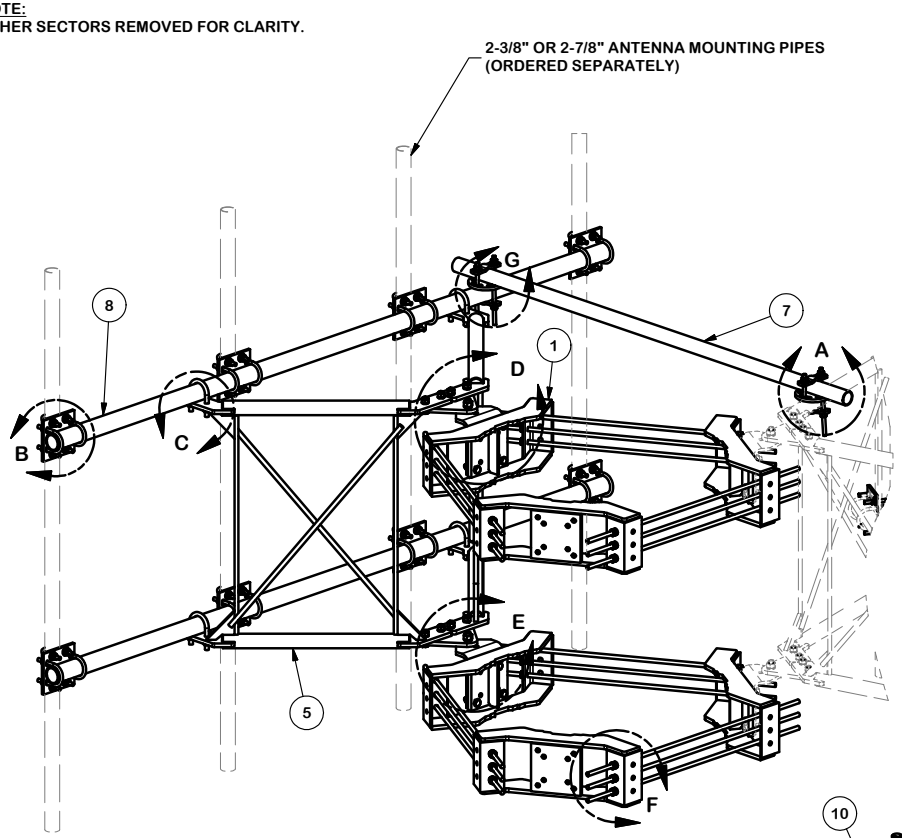
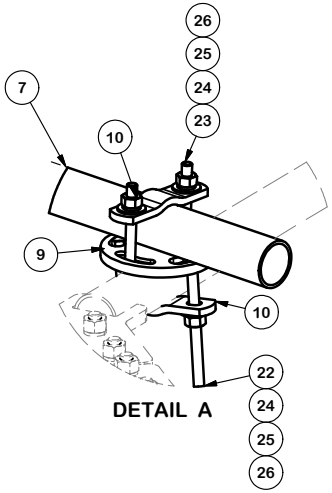
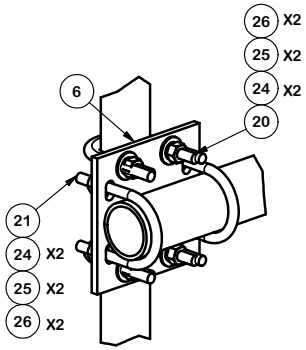




DETAIL A



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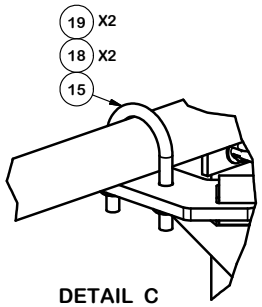

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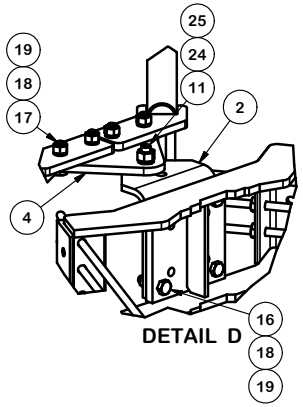

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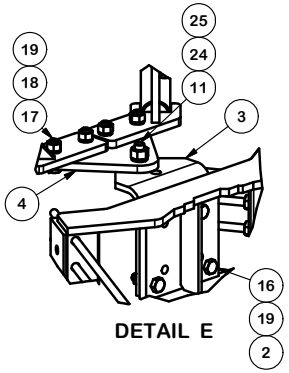

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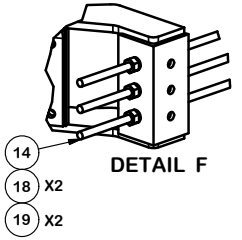

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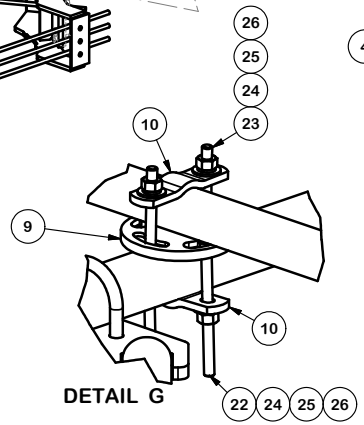

DETAIL G

ANT 15996

TOLERANCE NOTES

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CPD NO.	
DRAWN BY	CEK 9/15/2016
ENG. APPROVAL	
CHECKED BY	BMC 10/17/2016
CLASS / SUB	81 / 02
DRAWING USAGE	CUSTOMER
PART NO.	VFA10-HD3L4NP
DWG. NO.	VFA10-HD3L4NP

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

Date: **January 03, 2023**

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Site Number:	CTL05048
	Site Name:	EAST HAVEN SOUTH
	FA Number:	10071016
Crown Castle Designation:	**BU Number:**	842862
	Site Name:	EAST HAVEN SOUTH
	JDE Job Number:	686237
	Work Order Number:	2190025
	Order Number:	586266 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	2190025
Site Data:	**259 COMMERCE STREET, EAST HAVEN, NEW HAVEN County, CT**	
	Latitude *41° 15' 22.88"*, Longitude *-72° 52' 32.8"*	
	58 Foot - Monopole Tower	

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

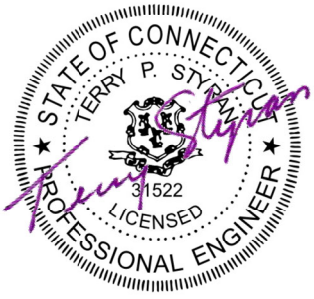
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity - 72.9%**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 121 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Tyler Ho

Respectfully submitted by:



Terry P. Styran, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 58 ft Monopole tower designed by FWT INC.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	121 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
54.0	57.0	3	ericsson	AIR 6419 B77G_CCIV3 w/ Mount Pipe	2 6 6 1	3/8 13/16 7/8 Conduit
	55.0	3	cci antennas	TPA65R-BU6D_CCIV2 w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14_CCIV2		
		3	ericsson	RRUS 8843 B2/B66A		
		3	ericsson	RRUS-32 B30		
		3	kathrein	80010965 w/ Mount Pipe		
		1	raycap	DC6-48-60-18-8C		
		2	raycap	DC6-48-60-18-8F		
	54.0	1	site pro 1	VFA10-HD3L4NP (3)		
		-	-	Mount Modifications		
		2	tower mounts	Pipe Mount [PM 602-3]		
	53.0	3	ericsson	AIR 6449 B77D_CCVI2 w/ Mount Pipe		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
47.0	47.0	3	ericsson	AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	3	1-5/8
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 303-1_HR-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
37.0	37.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4291659	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4529325	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4291655	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	58 - 50.5	Pole	TP19.078x17.393x0.188	1	-2.730	690.552	3.9	Pass
L2	50.5 - 0	Pole	TP30.05x18.141x0.188	2	-14.225	1091.643	72.9	Pass
							Summary	
						Pole (L2)	72.9	Pass
						Rating =	72.9	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	63.3	Pass
1	Base Plate	0	62.4	Pass
1	Base Foundation (Structure)	0	31.8	Pass
1	Base Foundation (Soil Interaction)	0	48.7	Pass

Structure Rating (max from all components) =	72.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

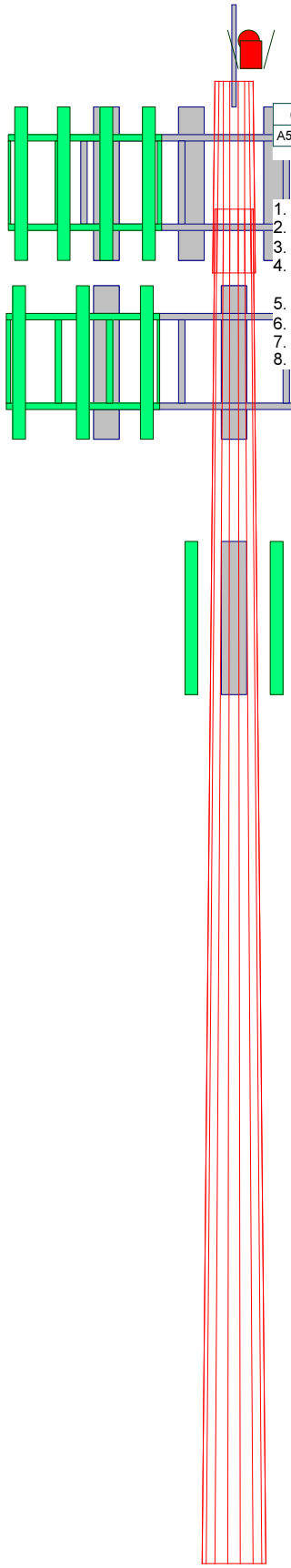
TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	7.500	18	0.188	2.500	17.393	19.078		0.3
2	53.000	18	0.188		18.141	30.050	A572-65	2.6
								2.8

58.0 ft

50.5 ft

0.0 ft



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 121 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 72.9%

ALL REACTIONS ARE FACTORED

AXIAL 19 K

SHEAR 2 K

MOMENT 106 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL 14 K

SHEAR 11 K

MOMENT 511 kip-ft

TORQUE 0 kip-ft
REACTIONS - 121 mph WIND

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: **BU# 842862**			
Project:			
Client: Crown Castle	Drawn by: THo		App'd:
Code: TIA-222-H	Date: 01/03/23		Scale: NTS
Path: C:\WORK SPACE\842862\WO 2190025 - SA\Prod\842862.eri			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Tower base elevation above sea level: 41.000 ft.
- Basic wind speed of 121 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	58.000-50.500	7.500	2.500	18	17.393	19.078	0.188	0.750	A572-65 (65 ksi)
L2	50.500-0.000	53.000		18	18.141	30.050	0.188	0.750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	17.632	10.239	382.955	6.108	8.836	43.342	766.414	5.121	2.731	14.566
	19.343	11.242	506.846	6.706	9.692	52.297	1014.359	5.622	3.028	16.148
L2	18.963	10.685	435.128	6.374	9.216	47.215	870.829	5.343	2.863	15.269
	30.485	17.772	2002.277	10.601	15.265	131.164	4007.188	8.888	4.959	26.447

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 58.000-50.500				1	1	1			
L2 50.500-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
54 **										
FB-L98B-034-XXX(3/8)	C	No	Surface Ar (CaAa)	54.000 - 0.000	2	2	-0.400 -0.350	0.000		0.057
2" Rigid Conduit	C	No	Surface Ar (CaAa)	54.000 - 0.000	1	1	-0.500 -0.350	2.000		2.800
D ***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
54 ** **									
PWRT-608-S(13/16)	C	No	No	Inside Pole	54.000 - 0.000	6	No Ice	0.000	0.620
							1/2" Ice	0.000	0.620
							1" Ice	0.000	0.620
LDF5-50A(7/8)	C	No	No	Inside Pole	54.000 - 0.000	6	No Ice	0.000	0.330
							1/2" Ice	0.000	0.330
							1" Ice	0.000	0.330
D ***D***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	37.000 - 0.000	6	No Ice	0.000	0.820

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1/2" Ice	0.000	0.820
							1" Ice	0.000	0.820
D *S*									
HCS 6X12 4AWG(1-5/8) ***	C	No	No	Inside Pole	47.000 - 0.000	3	No Ice	0.000	2.400
							1/2" Ice	0.000	2.400
							1" Ice	0.000	2.400

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	58.000-50.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.700	0.000	0.030
L2	50.500-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	10.100	0.000	0.955

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	58.000-50.500	A	0.893	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	2.107	0.000	0.045
L2	50.500-0.000	A	0.825	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	30.399	0.000	1.164

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	58.000-50.500	0.616	0.499	0.874	0.762
L2	50.500-0.000	1.203	0.974	1.677	1.463

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	6	FB-L98B-034-XXX(3/8)	50.50 - 54.00	1.0000	1.0000
L1	8	2" Rigid Conduit	50.50 - 54.00	1.0000	1.0000
L2	6	FB-L98B-034-XXX(3/8)	0.00 - 50.50	1.0000	1.0000
L2	8	2" Rigid Conduit	0.00 - 50.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) Side Lighting	B	From Leg	0.000 0.000 0.500	0.000	58.000
Lightning Rod 1/2" x 2'	A	From Leg	4.000 0.000 1.000	0.000	58.000
54 80010965 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	54.000
80010965 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	54.000
80010965 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	54.000
TPA65R-BU6D_CCIV2 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	54.000
TPA65R-BU6D_CCIV2 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	54.000
TPA65R-BU6D_CCIV2 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	54.000
AIR 6419 B77G_CCIV3 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	54.000
AIR 6419 B77G_CCIV3 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	54.000
AIR 6419 B77G_CCIV3 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	54.000
AIR 6449 B77D_CCVI2 w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	54.000
AIR 6449 B77D_CCVI2 w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	54.000
AIR 6449 B77D_CCVI2 w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	54.000
RRUS 4478 B14_CCIV2	A	From Leg	4.000 0.000 1.000	0.000	54.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RRUS 4478 B14_CCIV2	B	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 4478 B14_CCIV2	C	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS-32 B30	A	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS-32 B30	B	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS-32 B30	C	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 4449 B5/B12	A	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 4449 B5/B12	B	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 4449 B5/B12	C	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 8843 B2/B66A	A	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 8843 B2/B66A	B	From Leg	4.000 0.000 1.000	0.000	54.000
RRUS 8843 B2/B66A	C	From Leg	4.000 0.000 1.000	0.000	54.000
DC6-48-60-18-8C	B	From Leg	4.000 0.000 1.000	0.000	54.000
(2) DC6-48-60-18-8F	A	From Leg	4.000 0.000 1.000	0.000	54.000
(2) Pipe Mount [PM 602-3]	C	None		0.000	54.000
site pro 1 VFA10-HD3L4NP	A	From Leg	2.000 0.000 0.000	0.000	54.000
site pro 1 VFA10-HD3L4NP	B	From Leg	2.000 0.000 0.000	0.000	54.000
site pro 1 VFA10-HD3L4NP	C	From Leg	2.000 0.000 0.000	0.000	54.000
D *47*					
AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	47.000
AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	47.000
AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	47.000
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	47.000
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	47.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	0.000 4.000 0.000	0.000	47.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	0.000 4.000 0.000	0.000	47.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	0.000 4.000 0.000	0.000	47.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	0.000 4.000 0.000	0.000	47.000
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	0.000 4.000 0.000	0.000	47.000
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	0.000 4.000 0.000	0.000	47.000
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	0.000 4.000 0.000	0.000	47.000
RRUS 4415 B25	A	From Leg	0.000 4.000 0.000	0.000	47.000
RRUS 4415 B25	B	From Leg	0.000 4.000 0.000	0.000	47.000
RRUS 4415 B25	C	From Leg	0.000 4.000 0.000	0.000	47.000
8' x 2.375" Mount Pipe	A	From Leg	0.000 4.000 0.000	0.000	47.000
8' x 2.375" Mount Pipe	B	From Leg	0.000 4.000 0.000	0.000	47.000
8' x 2.375" Mount Pipe	C	From Leg	0.000 4.000 0.000	0.000	47.000
Platform Mount [LP 303-1_HR-1] ***D*** *37*	C	None	0.000	0.000	47.000
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.000 0.000	0.000	37.000
APXV18-206517S-C w/ Mount Pipe	B	From Leg	0.000 1.000 0.000	0.000	37.000
APXV18-206517S-C w/ Mount Pipe	C	From Leg	0.000 1.000 0.000	0.000	37.000
D			0.000		

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	58 - 50.5	Pole	Max Tension	2	0.000	0.000	-0.000
			Max. Compression	26	-6.145	-0.303	0.472
			Max. Mx	8	-2.730	-11.749	0.126
			Max. My	2	-2.730	-0.067	11.809
			Max. Vy	8	5.308	-9.346	0.247
			Max. Vx	2	-5.308	-0.129	9.466
			Max. Torque	10			0.264
L2	50.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-19.118	-0.305	0.048
			Max. Mx	8	-14.225	-511.421	0.067
			Max. My	2	-14.225	-0.144	511.345
			Max. Vy	8	11.021	-511.421	0.067

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-11.021	-0.144	511.345
			Max. Torque	10			0.264

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	19.118	-2.389	0.000
	Max. H_x	20	14.244	10.997	0.000
	Max. H_z	2	14.244	-0.000	10.997
	Max. M_x	2	511.345	-0.000	10.997
	Max. M_z	8	511.421	-10.997	0.000
	Max. Torsion	10	0.264	-9.523	-5.498
	Min. Vert	19	10.683	9.523	-5.498
	Min. H_x	8	14.244	-10.997	0.000
	Min. H_z	14	14.244	-0.000	-10.997
	Min. M_x	14	-511.209	-0.000	-10.997
	Min. M_z	20	-511.133	10.997	0.000
	Min. Torsion	22	-0.264	9.523	5.498

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	11.870	0.000	0.000	-0.049	-0.114	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	14.244	0.000	-10.997	-511.345	-0.144	0.169
0.9 Dead+1.0 Wind 0 deg - No Ice	10.683	0.000	-10.997	-506.889	-0.106	0.167
1.2 Dead+1.0 Wind 30 deg - No Ice	14.244	5.498	-9.523	-442.848	-255.783	0.043
0.9 Dead+1.0 Wind 30 deg - No Ice	10.683	5.498	-9.523	-438.985	-253.526	0.043
1.2 Dead+1.0 Wind 60 deg - No Ice	14.244	9.523	-5.498	-255.707	-442.924	-0.095
0.9 Dead+1.0 Wind 60 deg - No Ice	10.683	9.523	-5.498	-253.469	-439.043	-0.093
1.2 Dead+1.0 Wind 90 deg - No Ice	14.244	10.997	-0.000	-0.067	-511.421	-0.207
0.9 Dead+1.0 Wind 90 deg - No Ice	10.683	10.997	-0.000	-0.049	-506.946	-0.204
1.2 Dead+1.0 Wind 120 deg - No Ice	14.244	9.523	5.498	255.572	-442.924	-0.264
0.9 Dead+1.0 Wind 120 deg - No Ice	10.683	9.523	5.498	253.371	-439.043	-0.260
1.2 Dead+1.0 Wind 150 deg - No Ice	14.244	5.498	9.523	442.713	-255.783	-0.250
0.9 Dead+1.0 Wind 150 deg - No Ice	10.683	5.498	9.523	438.887	-253.526	-0.247
1.2 Dead+1.0 Wind 180 deg - No Ice	14.244	0.000	10.997	511.209	-0.144	-0.169
0.9 Dead+1.0 Wind 180 deg - No Ice	10.683	0.000	10.997	506.790	-0.106	-0.167
1.2 Dead+1.0 Wind 210 deg - No Ice	14.244	-5.498	9.523	442.712	255.495	-0.043
0.9 Dead+1.0 Wind 210 deg - No Ice	10.683	-5.498	9.523	438.887	253.313	-0.043
1.2 Dead+1.0 Wind 240 deg - No Ice	14.244	-9.523	5.498	255.572	442.636	0.095

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 240 deg - No Ice	10.683	-9.523	5.498	253.371	438.830	0.093
1.2 Dead+1.0 Wind 270 deg - No Ice	14.244	-10.997	-0.000	-0.067	511.133	0.207
0.9 Dead+1.0 Wind 270 deg - No Ice	10.683	-10.997	-0.000	-0.049	506.733	0.204
1.2 Dead+1.0 Wind 300 deg - No Ice	14.244	-9.523	-5.498	-255.706	442.636	0.264
0.9 Dead+1.0 Wind 300 deg - No Ice	10.683	-9.523	-5.498	-253.469	438.830	0.260
1.2 Dead+1.0 Wind 330 deg - No Ice	14.244	-5.498	-9.523	-442.847	255.496	0.250
0.9 Dead+1.0 Wind 330 deg - No Ice	10.683	-5.498	-9.523	-438.985	253.314	0.247
1.2 Dead+1.0 Ice+1.0 Temp	19.118	0.000	0.000	-0.048	-0.305	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	19.118	0.000	-2.389	-105.697	-0.326	0.051
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	19.118	1.195	-2.069	-91.545	-53.144	0.009
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	19.118	2.069	-1.195	-52.880	-91.809	-0.036
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	19.118	2.389	-0.000	-0.062	-105.961	-0.071
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	19.118	2.069	1.195	52.755	-91.809	-0.087
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	19.118	1.195	2.069	91.420	-53.144	-0.079
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	19.118	0.000	2.389	105.572	-0.326	-0.051
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	19.118	-1.195	2.069	91.420	52.491	-0.009
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	19.118	-2.069	1.195	52.755	91.156	0.036
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	19.118	-2.389	-0.000	-0.062	105.308	0.071
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	19.118	-2.069	-1.195	-52.880	91.156	0.086
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	19.118	-1.195	-2.069	-91.545	52.491	0.079
Dead+Wind 0 deg - Service	11.870	0.000	-2.550	-118.047	-0.119	0.046
Dead+Wind 30 deg - Service	11.870	1.275	-2.209	-102.239	-59.115	0.013
Dead+Wind 60 deg - Service	11.870	2.209	-1.275	-59.051	-102.303	-0.023
Dead+Wind 90 deg - Service	11.870	2.550	0.000	-0.055	-118.111	-0.053
Dead+Wind 120 deg - Service	11.870	2.209	1.275	58.941	-102.303	-0.069
Dead+Wind 150 deg - Service	11.870	1.275	2.209	102.129	-59.115	-0.066
Dead+Wind 180 deg - Service	11.870	0.000	2.550	117.936	-0.119	-0.046
Dead+Wind 210 deg - Service	11.870	-1.275	2.209	102.129	58.877	-0.013
Dead+Wind 240 deg - Service	11.870	-2.209	1.275	58.941	102.065	0.023
Dead+Wind 270 deg - Service	11.870	-2.550	0.000	-0.055	117.873	0.053
Dead+Wind 300 deg - Service	11.870	-2.209	-1.275	-59.051	102.065	0.069
Dead+Wind 330 deg - Service	11.870	-1.275	-2.209	-102.239	58.877	0.066

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-11.870	0.000	0.000	11.870	0.000	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
2	0.000	-14.244	-10.997	-0.000	14.244	10.997	0.000%
3	0.000	-10.683	-10.997	-0.000	10.683	10.997	0.000%
4	5.498	-14.244	-9.523	-5.498	14.244	9.523	0.000%
5	5.498	-10.683	-9.523	-5.498	10.683	9.523	0.000%
6	9.523	-14.244	-5.498	-9.523	14.244	5.498	0.000%
7	9.523	-10.683	-5.498	-9.523	10.683	5.498	0.000%
8	10.997	-14.244	0.000	-10.997	14.244	0.000	0.000%
9	10.997	-10.683	0.000	-10.997	10.683	0.000	0.000%
10	9.523	-14.244	5.498	-9.523	14.244	-5.498	0.000%
11	9.523	-10.683	5.498	-9.523	10.683	-5.498	0.000%
12	5.498	-14.244	9.523	-5.498	14.244	-9.523	0.000%
13	5.498	-10.683	9.523	-5.498	10.683	-9.523	0.000%
14	0.000	-14.244	10.997	-0.000	14.244	-10.997	0.000%
15	0.000	-10.683	10.997	-0.000	10.683	-10.997	0.000%
16	-5.498	-14.244	9.523	5.498	14.244	-9.523	0.000%
17	-5.498	-10.683	9.523	5.498	10.683	-9.523	0.000%
18	-9.523	-14.244	5.498	9.523	14.244	-5.498	0.000%
19	-9.523	-10.683	5.498	9.523	10.683	-5.498	0.000%
20	-10.997	-14.244	0.000	10.997	14.244	0.000	0.000%
21	-10.997	-10.683	0.000	10.997	10.683	0.000	0.000%
22	-9.523	-14.244	-5.498	9.523	14.244	5.498	0.000%
23	-9.523	-10.683	-5.498	9.523	10.683	5.498	0.000%
24	-5.498	-14.244	-9.523	5.498	14.244	9.523	0.000%
25	-5.498	-10.683	-9.523	5.498	10.683	9.523	0.000%
26	0.000	-19.118	0.000	0.000	19.118	0.000	0.000%
27	0.000	-19.118	-2.389	-0.000	19.118	2.389	0.000%
28	1.195	-19.118	-2.069	-1.195	19.118	2.069	0.000%
29	2.069	-19.118	-1.195	-2.069	19.118	1.195	0.000%
30	2.389	-19.118	0.000	-2.389	19.118	0.000	0.000%
31	2.069	-19.118	1.195	-2.069	19.118	-1.195	0.000%
32	1.195	-19.118	2.069	-1.195	19.118	-2.069	0.000%
33	0.000	-19.118	2.389	-0.000	19.118	-2.389	0.000%
34	-1.195	-19.118	2.069	1.195	19.118	-2.069	0.000%
35	-2.069	-19.118	1.195	2.069	19.118	-1.195	0.000%
36	-2.389	-19.118	0.000	2.389	19.118	0.000	0.000%
37	-2.069	-19.118	-1.195	2.069	19.118	1.195	0.000%
38	-1.195	-19.118	-2.069	1.195	19.118	2.069	0.000%
39	0.000	-11.870	-2.550	0.000	11.870	2.550	0.000%
40	1.275	-11.870	-2.209	-1.275	11.870	2.209	0.000%
41	2.209	-11.870	-1.275	-2.209	11.870	1.275	0.000%
42	2.550	-11.870	0.000	-2.550	11.870	0.000	0.000%
43	2.209	-11.870	1.275	-2.209	11.870	-1.275	0.000%
44	1.275	-11.870	2.209	-1.275	11.870	-2.209	0.000%
45	0.000	-11.870	2.550	0.000	11.870	-2.550	0.000%
46	-1.275	-11.870	2.209	1.275	11.870	-2.209	0.000%
47	-2.209	-11.870	1.275	2.209	11.870	-1.275	0.000%
48	-2.550	-11.870	0.000	2.550	11.870	0.000	0.000%
49	-2.209	-11.870	-1.275	2.209	11.870	1.275	0.000%
50	-1.275	-11.870	-2.209	1.275	11.870	2.209	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00021173
3	Yes	4	0.00000001	0.00013295
4	Yes	5	0.00000001	0.00015002
5	Yes	5	0.00000001	0.00007019
6	Yes	5	0.00000001	0.00015141
7	Yes	5	0.00000001	0.00007085
8	Yes	4	0.00000001	0.00025637
9	Yes	4	0.00000001	0.00016162
10	Yes	5	0.00000001	0.00014196
11	Yes	5	0.00000001	0.00006634

12	Yes	5	0.00000001	0.00015517
13	Yes	5	0.00000001	0.00007278
14	Yes	4	0.00000001	0.00021144
15	Yes	4	0.00000001	0.00013283
16	Yes	5	0.00000001	0.00014679
17	Yes	5	0.00000001	0.00006874
18	Yes	5	0.00000001	0.00014550
19	Yes	5	0.00000001	0.00006812
20	Yes	4	0.00000001	0.00025607
21	Yes	4	0.00000001	0.00016149
22	Yes	5	0.00000001	0.00015572
23	Yes	5	0.00000001	0.00007302
24	Yes	5	0.00000001	0.00014241
25	Yes	5	0.00000001	0.00006654
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00034949
28	Yes	4	0.00000001	0.00039202
29	Yes	4	0.00000001	0.00039298
30	Yes	4	0.00000001	0.00035043
31	Yes	4	0.00000001	0.00038771
32	Yes	4	0.00000001	0.00039086
33	Yes	4	0.00000001	0.00034628
34	Yes	4	0.00000001	0.00038376
35	Yes	4	0.00000001	0.00038327
36	Yes	4	0.00000001	0.00034635
37	Yes	4	0.00000001	0.00039060
38	Yes	4	0.00000001	0.00038702
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00005290
41	Yes	4	0.00000001	0.00005453
42	Yes	4	0.00000001	0.00001694
43	Yes	4	0.00000001	0.00004384
44	Yes	4	0.00000001	0.00006210
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00004783
47	Yes	4	0.00000001	0.00004666
48	Yes	4	0.00000001	0.00001688
49	Yes	4	0.00000001	0.00006281
50	Yes	4	0.00000001	0.00004408

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	58 - 50.5	5.205	40	0.681	0.001
L2	53 - 0	4.492	40	0.680	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
58.000	(2) Side Lighting	40	5.205	0.681	0.001	4903
54.000	80010965 w/ Mount Pipe	40	4.631	0.681	0.001	4903
47.000	AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	41	3.718	0.660	0.001	4521
37.000	APXV18-206517S-C w/ Mount Pipe	41	2.634	0.583	0.001	5742

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	58 - 50.5	22.525	2	2.946	0.006
L2	53 - 0	19.443	2	2.941	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
58.000	(2) Side Lighting	2	22.525	2.946	0.006	1141
54.000	80010965 w/ Mount Pipe	2	20.044	2.945	0.005	1141
47.000	AIR 32 B2A B66AA_T-MOBILE w/ Mount Pipe	8	16.097	2.858	0.005	1051
37.000	APXV18-206517S-C w/ Mount Pipe	8	11.412	2.525	0.004	1334

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	58 - 50.5 (1)	TP19.078x17.393x0.188	7.500	0.000	0.0	11.242	-2.730	657.669	0.004
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	53.000	0.000	0.0	17.772	-14.225	1039.660	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	58 - 50.5 (1)	TP19.078x17.393x0.188	11.827	319.168	0.037	0.000	319.168	0.000
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	511.438	681.328	0.751	0.000	681.328	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	58 - 50.5 (1)	TP19.078x17.393x0.188	2.832	197.301	0.014	0.022	326.402	0.000
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	11.021	311.897	0.035	0.095	815.676	0.000

Pole Interaction Design Data

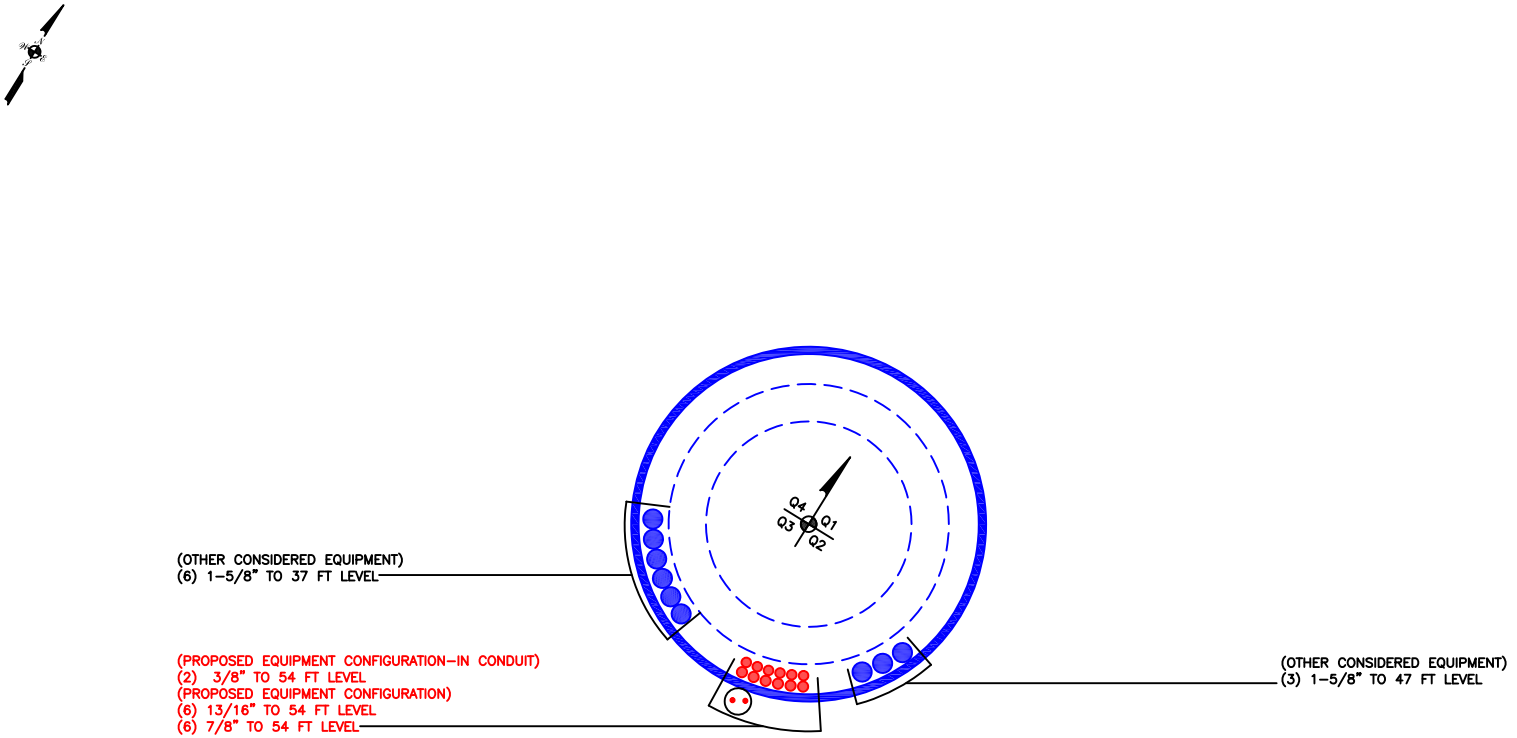
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	58 - 50.5 (1)	0.004	0.037	0.000	0.014	0.000	0.041	1.050	4.8.2
L2	50.5 - 0 (2)	0.014	0.751	0.000	0.035	0.000	0.766	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	58 - 50.5	Pole	TP19.078x17.393x0.188	1	-2.730	690.552	3.9	Pass
L2	50.5 - 0	Pole	TP30.05x18.141x0.188	2	-14.225	1091.643	72.9	Pass
							Summary	
						Pole (L2)	72.9	Pass
						RATING =	**72.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 37 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION-IN CONDUIT)
(2) 3/8" TO 54 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(6) 13/16" TO 54 FT LEVEL
(6) 7/8" TO 54 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 47 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

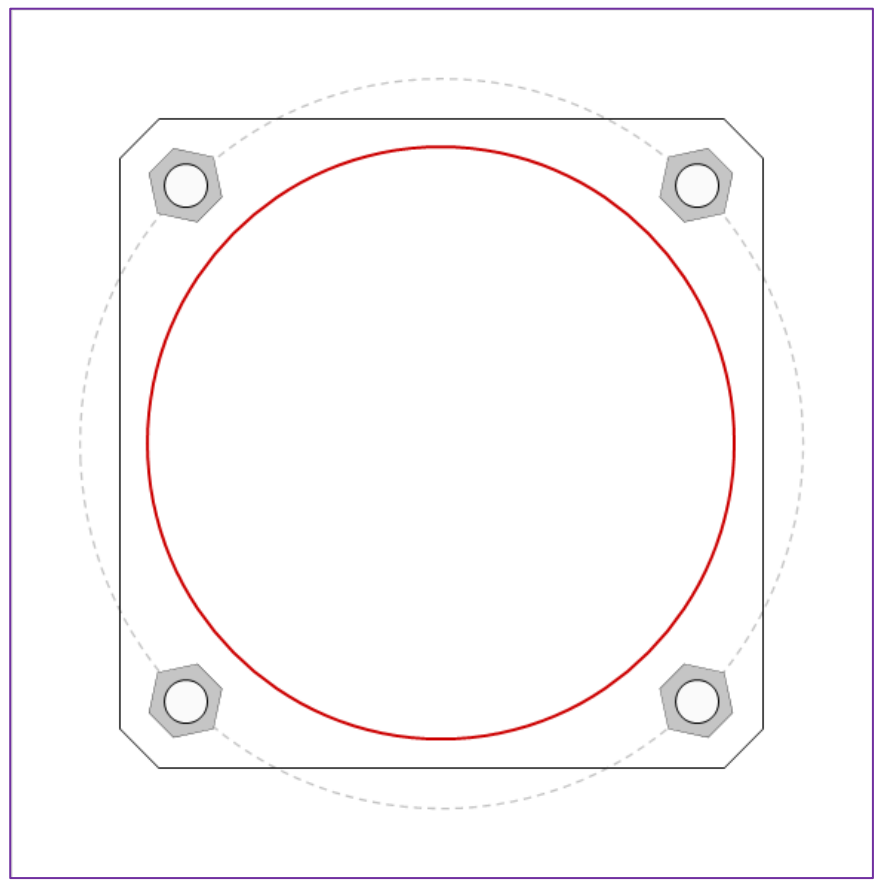
Monopole Base Plate Connection

Site Info	
BU #	842862
Site Name	EAST HAVEN SOUTH
Order #	586266 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	511.44
Axial Force (kips)	14.22
Shear Force (kips)	11.02

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(4) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 37" BC

Base Plate Data

33" W x 2" Plate (A 633 Gr. E; Fy=60 ksi, Fu=70 ksi); Clip: 2 in

Stiffener Data

N/A

Pole Data

30.05" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 162.06	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.76	ϕVn = 149.1	**63.3%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	35.37	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**62.4%**	**Pass**

Pier and Pad Foundation

BU # :	842862
Site Name:	EAST HAVEN SOU
App. Number:	586266 Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	14.24	kips
Base Shear, Vu_comp:	11	kips
Moment, M_u:	511.44	ft-kips
Tower Height, **H**:	58	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	15	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	14	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.5	ft
Pad Width, W_1:	14	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	13	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	120	pcf
Ultimate Net Bearing, Qnet:	10.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	21	
Base Friction, μ:	0.4	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	8	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	102.69	11.00	**10.2%**	**Pass**
Bearing Pressure (ksf)	8.09	2.05	**25.3%**	**Pass**
*Overturning (kip*ft)*	1213.08	590.96	**48.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	1679.66	560.94	**31.8%**	**Pass**
Pier Compression (kip)	11934.00	34.49	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	1145.25	169.28	**14.1%**	**Pass**
Pad Shear - 1-way (kips)	351.97	42.02	**11.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.014	**8.2%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	1971.95	336.56	**16.3%**	**Pass**

**Rating per TIA-222-H Section 15.5*

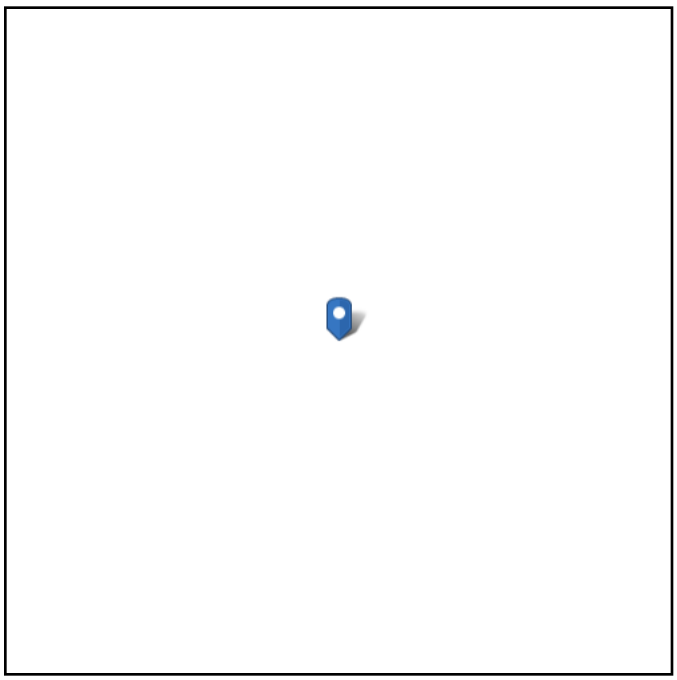
Structural Rating*:	**31.8%**
Soil Rating*:	**48.7%**

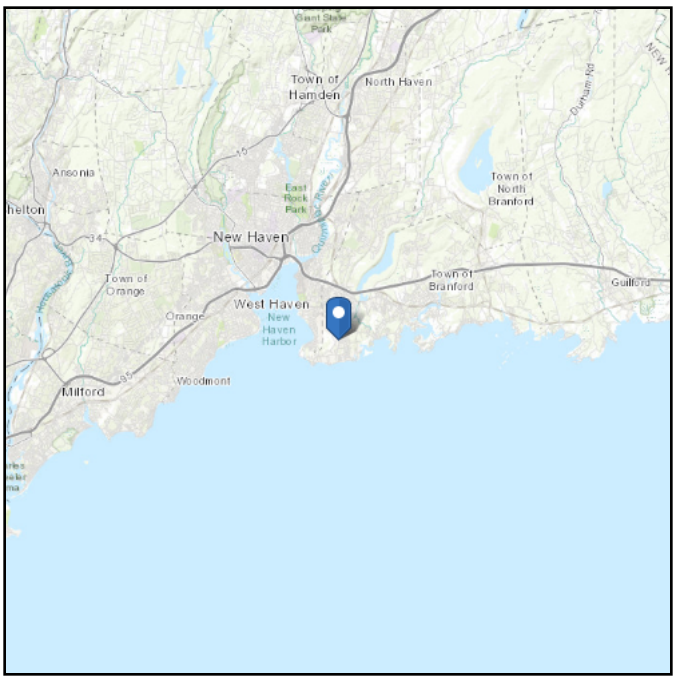
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 41.256356
Longitude: -72.875778
Elevation: 35.45 ft (NAVD 88)





Wind

Results:

Wind Speed	121 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Jan 03 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Seismic

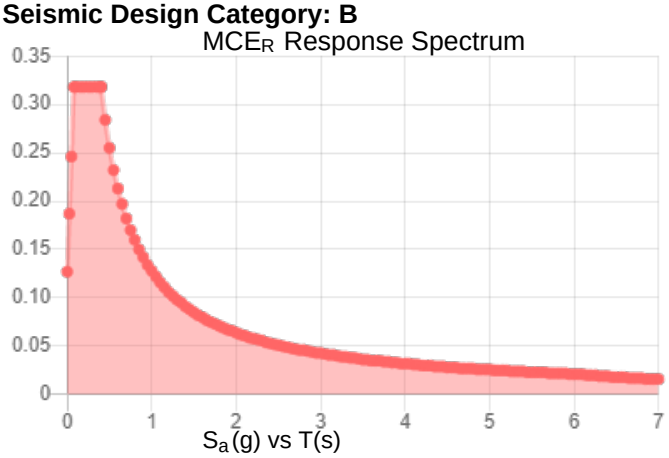
D - Stiff Soil

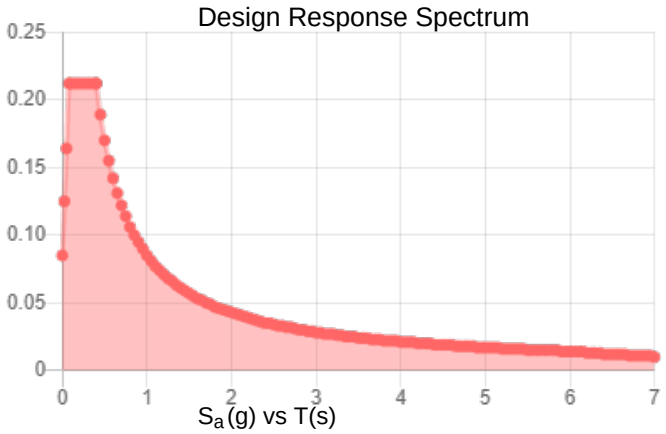
Site Soil Class:

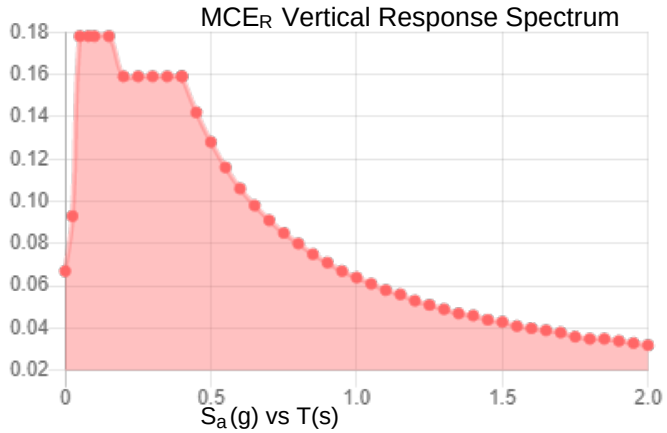
Results:

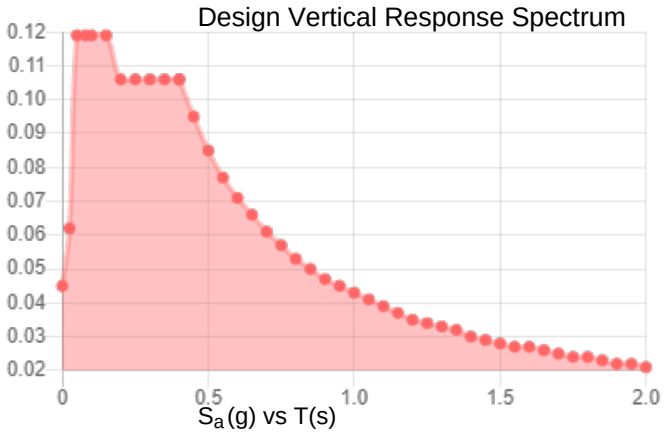
S_S :	0.199	S_{D1} :	0.085
S_1 :	0.053	T_L :	6
F_a :	1.6	PGA :	0.111
F_v :	2.4	PGA_M :	0.175
S_{MS} :	0.318	F_{PGA} :	1.578
S_{M1} :	0.128	I_e :	1
S_{DS} :	0.212	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Tue Jan 03 2023**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Jan 03 2023

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

AT&T

AT&T SITE NUMBER:	**CTL05048**	**BUSINESS UNIT #:**	**842862**
AT&T SITE NAME:	**EAST HAVEN SOUTH**	**SITE ADDRESS:**	**259 COMMERCE STREET**
AT&T FA CODE:	**10071016**		**EAST HAVEN, CT 06512**
AT&T PACE NUMBER:	**MRCTB055428, MRCTB053612, MRCTB054215, MRCTB054789, MRCTB054142, MRCTB053749**	**COUNTY:**	**NEW HAVEN**
		SITE TYPE:	**MONOPOLE**
AT&T PROJECT:	**BBU RECONFIGURATION WITH NEW IDS, 5G NR ACTIVATION, LTE 6C, 5G NR 1SR CBAND**	**TOWER HEIGHT:**	**58'-0"**

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	EAST HAVEN SOUTH
SITE ADDRESS:	259 COMMERCE STREET EAST HAVEN, CT 06512
COUNTY:	NEW HAVEN
MAP/PARCEL #:	090-1013-005
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 15' 22.88"
LONGITUDE:	-72° 52' 32.80"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	36'
CURRENT ZONING:	LI-2 LIGHT INDUSTRIAL
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	VIGLIONE STEPHEN J 259 COMMERCE ST EAST HAVEN, CT 06512
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	UNITED ILLUMINATING CO (800) 722-5584
TELCO PROVIDER:	ATT (866) 852-2721

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS MARVIN.PHILLIPS@BTGRP.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1505 WESTLAKE AVENUE NORTH, SUITE 800 SEATTLE, WA 98109 VERONICA CHAPMAN - PROJECT MANAGER VERONICA.CHAPMAN@BTGRP.COM JASON D'AMICO - CONSTRUCTION MANAGER JASON.D'AMICO@CROWNCASTEL.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

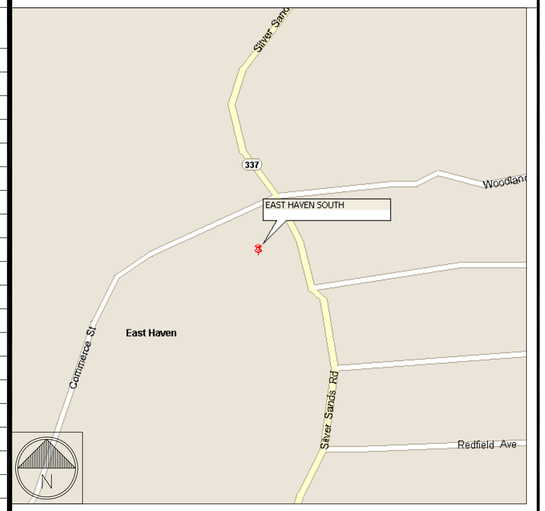
DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	SITE PLAN
C-1.2	EQUIPMENT PLANS
C-2	TOWER ELEVATION & ANTENNA PLANS
C-3	ANTENNA SCHEDULE
C-4	EQUIPMENT DETAILS
C-5	EQUIPMENT SPECS.
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM
ATTACHED	MOUNT SPECIFICATIONS
ATTACHED	STAND OFF MOUNT SPECIFICATIONS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR FULL SIZE. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS
BEFORE YOU DIG!

LOCATION MAP



NO SCALE

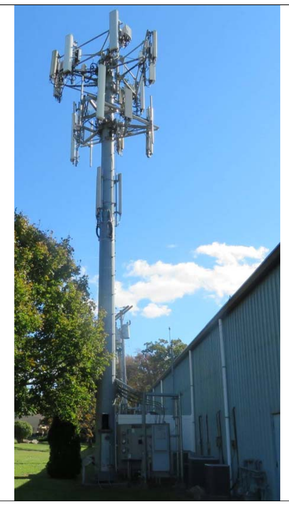
PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) QUNITEL - QS66512-6 ANTENNAS
- REMOVE (3) KATHREIN - 800-10121 ANTENNAS
- REMOVE (6) POWERWAVE TECH - LGP21401 TMA
- RELOCATE (3) KATHREIN - 800-10965 ANTENNAS
- RELOCATE (3) ERICSSON - 4449 B5/B12 RRH
- RELOCATE (3) ERICSSON - 8843 B2/B66A RRH
- RELOCATE (3) ERICSSON - RRUS-32 B30 RRH
- RELOCATE (3) SQUIDS
- INSTALL (6) ERICSSON - AIR6449 B77D(BELOW)+AIR6419 B77G(ABOVE) STACKED ANTENNAS W/ INTEGRATED RRH
- INSTALL (3) CCI -TPA65R-BU6DA-K ANTENNAS
- INSTALL (3) ERICSSON - 4478 B14 RRH
- INSTALL (3) BACK TO BACK MOUNTS
- INSTALL (2) VALMONT - PM1 STAND OFFS
- INSTALL NEW MOUNT PER MRA BY INFINIGY DATED 8/10/22
- INSTALL (6) Y CABLES

GROUND SCOPE OF WORK:
- REMOVE (2) 150AH BATTERY STRINGS
- REMOVE (6) LGP21901 DIPLEXERS
- REMOVE (1) UMTS CABINET
- REMOVE (1) 6601
- REMOVE (1) XMU
- INSTALL (6) RECTIFIERS
- INSTALL (2) 170AH BATTERY STRINGS
- INSTALL (1) BATTERY CABINET
- INSTALL (1) 6648 WITH XCEDE CABLE

SITE PHOTO



APPLICABLE CODES & REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2022 CONNECTICUT SBC/2021 IBC
MECHANICAL	2022 CONNECTICUT SBC/ 2021 IMC
ELECTRICAL	2022 CONNECTICUT SBC/ 2020 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE
DATED:	4/19/22
MOUNT REPLACEMENT ANALYSIS:	INFINIGY
DATED:	8/10/22
RFDS REVISION:	PRELIMINARY
DATED:	3/14/22
ORDER ID:	586266
REVISION:	0

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL05048

BU #: **842862**
EAST HAVEN SOUTH

259 COMMERCE STREET
EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	4/27/22	JTS	CONSTRUCTION	MTJ
1	7/19/22	JTS	CONSTRUCTION	MTJ
2	9/15/22	JTS	CONSTRUCTION	MTJ
3	9/26/22	JTS	CONSTRUCTION	MTJ
4	1/5/23	LR	CONSTRUCTION	LR

STATE OF CONNECTICUT
MARVIN T. PHILLIPS
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/5/23

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: T-1

REVISION: 4

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: AT&T
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER........40 ksi
   #5 BARS AND LARGER........60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH........3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER........2"
   #5 BARS AND SMALLER........1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS........3/4"
   BEAMS AND COLUMNS........1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "AT&T".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

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AT&T SITE NUMBER:
CTL05048

BU #: **842862**
EAST HAVEN SOUTH

259 COMMERCE STREET
EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	4/27/22	JTS	CONSTRUCTION	MTJ
1	7/19/22	JTS	CONSTRUCTION	MTJ
2	9/15/22	JTS	CONSTRUCTION	MTJ
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4	1/5/23	LR	CONSTRUCTION	LR

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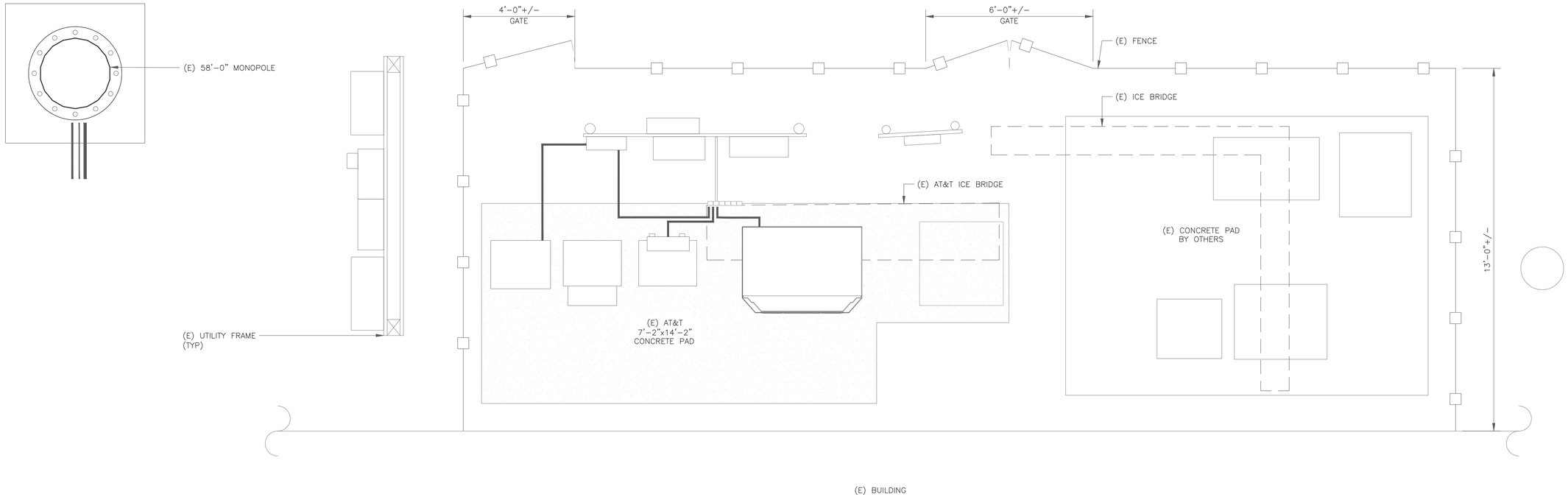
SHEET NUMBER: T-2
REVISION: 4



1 SITE PLAN

SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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STATE OF CONNECTICUT
GRANT LIKE
No. 23924
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PROFESSIONAL ENGINEER
1/5/23

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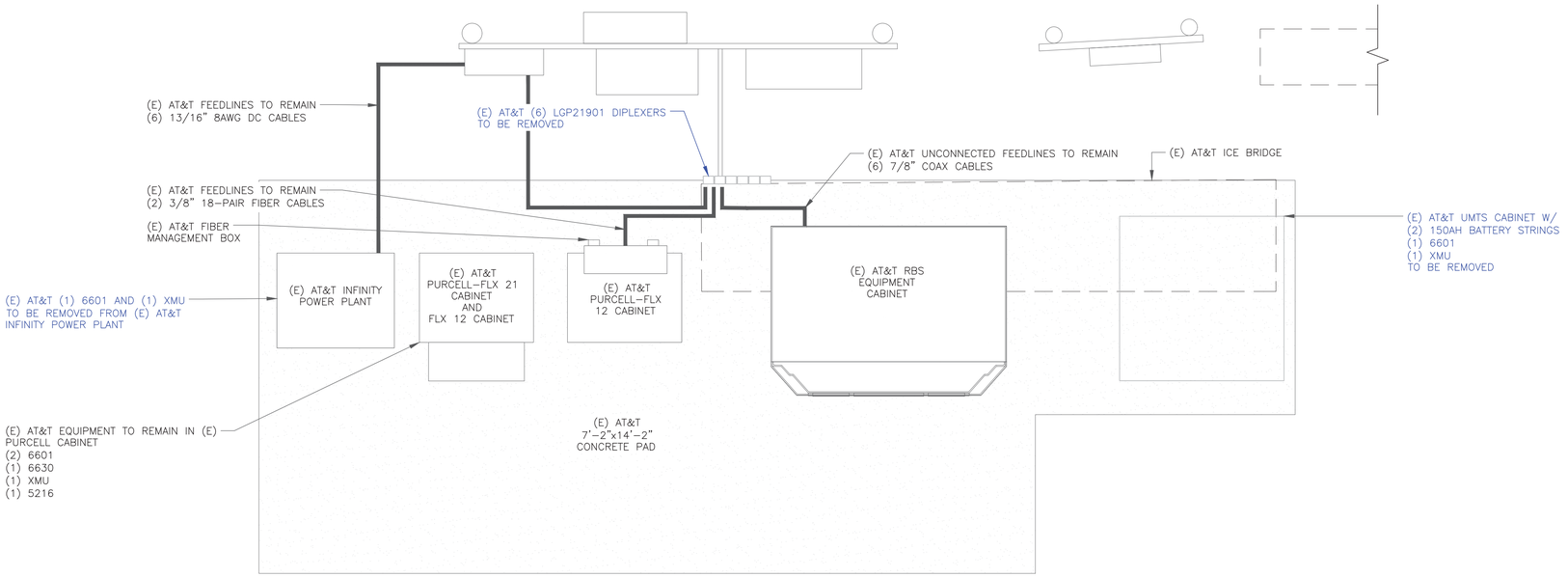
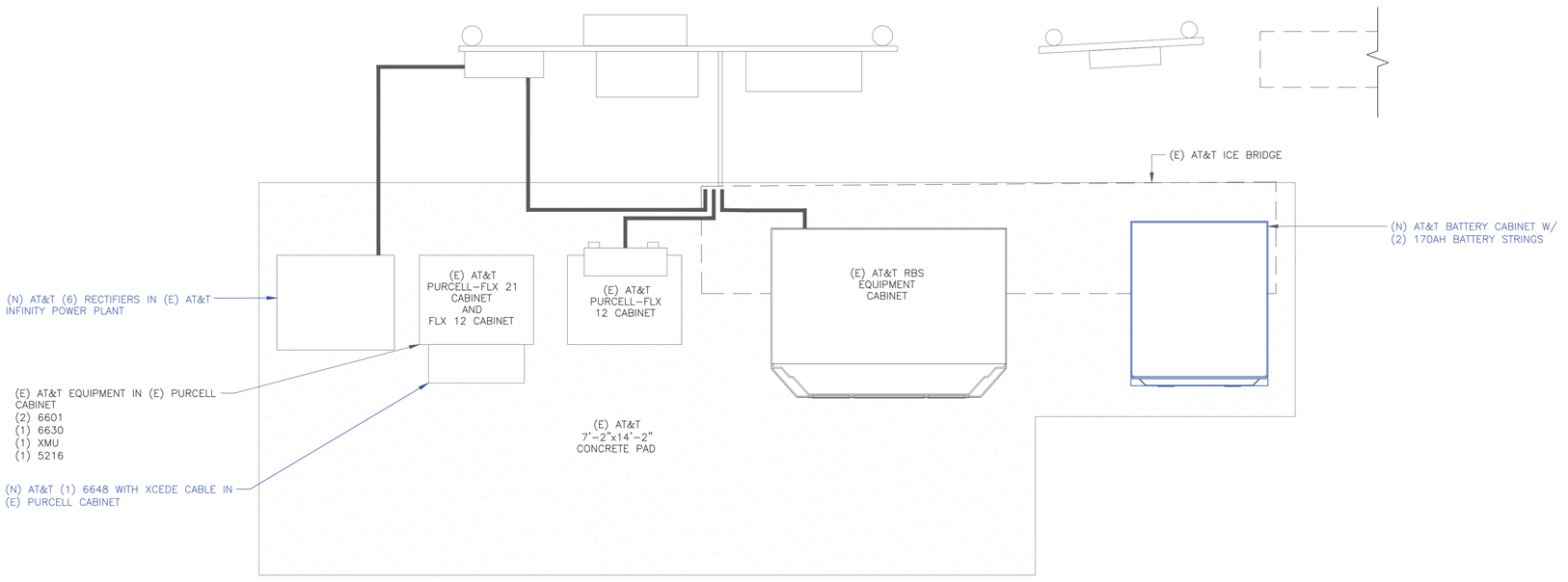
SHEET NUMBER: C-1.1

REVISION: 4



1 EXISTING EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)



2 FINAL EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

GROUND SCOPE OF WORK:

- REMOVE (2) 150AH BATTERY STRINGS
- REMOVE (6) LGP21901 DIPLEXERS
- REMOVE (1) UMTS CABINET
- REMOVE (1) 6601
- REMOVE (1) XMU
- INSTALL (6) RECTIFIERS
- INSTALL (5) 170AH BATTERY STRINGS
- INSTALL (1) BATTERY CABINET
- INSTALL (1) 6648 WITH XCEDE CABLE

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STATE OF CONNECTICUT
MICHAEL T. JOHNSON
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PROFESSIONAL ENGINEER
1/5/23

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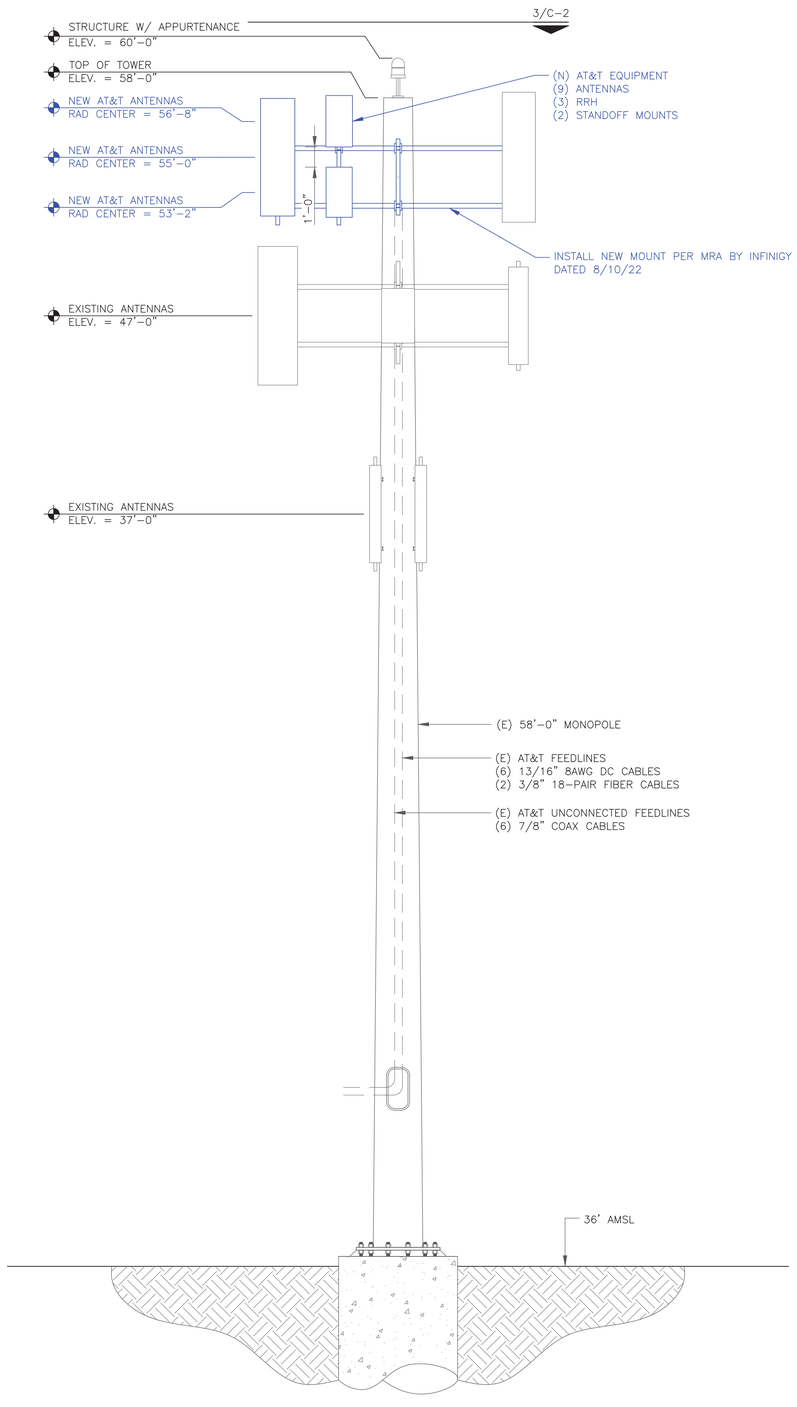
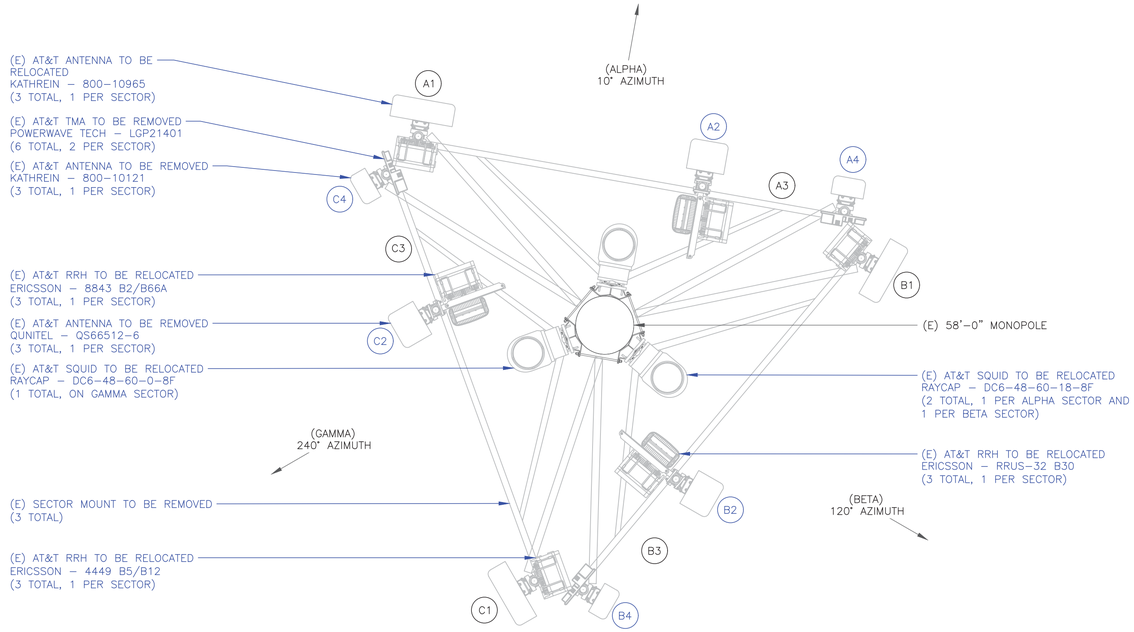
SHEET NUMBER: C-1.2

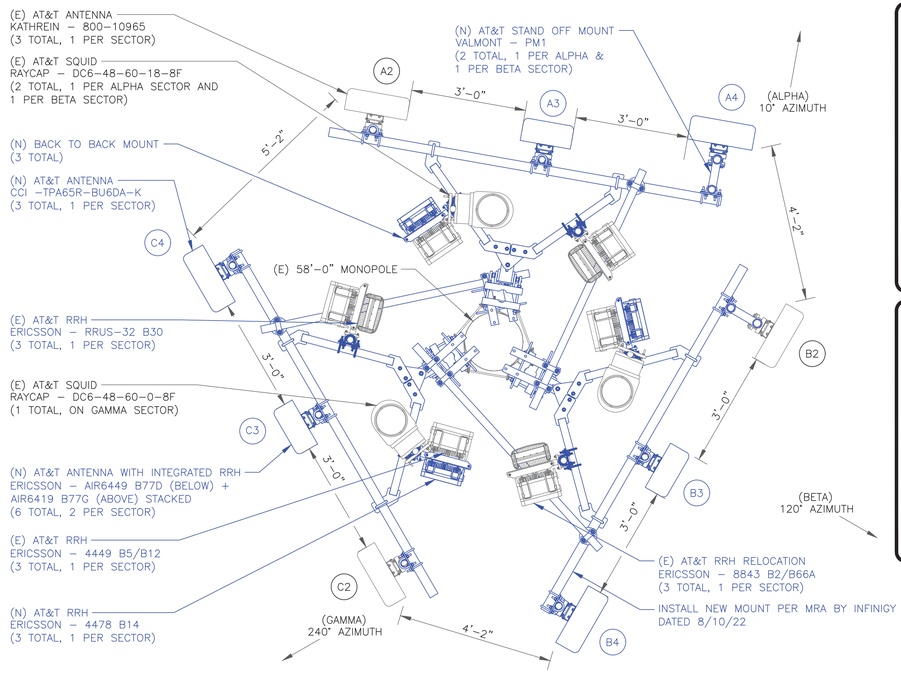
REVISION: 4



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)



3 FINAL ANTENNA PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

"LOOK UP" - CROWN CASTLE USA INC.
SAFETY CLIMB REQUIREMENT:

THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.

INSTALLER NOTES:

1. REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
2. REFERENCE C-4 FOR NEW EQUIPMENT SPECIFICATIONS.
3. CONTRACTOR TO VERIFY ALL ANTENNA TIP HEIGHTS DO NOT EXCEED BEACON BASE HEIGHT.
4. 3'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE ANTENNAS ON SAME SECTOR.
5. 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
6. 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
7. ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
8. 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.

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AT&T SITE NUMBER:
CTL05048

BU #: **842862**
EAST HAVEN SOUTH

259 COMMERCE STREET
EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

ISSUED FOR:

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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: C-2

REVISION: 4

FINAL EQUIPMENT SCHEDULE
(VERIFY WITH CURRENT RFDS)

POSITION	ANTENNA				RADIO			DIPLEXER			TMA			SURGE PROTECTION		CABLES			
	TECH.	STATUS/MANUFACTURER MODEL	AZIMUTH	RAD CENTER	QTY.	STATUS/MODEL	LOCATION	QTY.	STATUS	LOCATION	QTY.	STATUS/MANUFACTURER MODEL	QTY.	STATUS/MODEL	QTY.	STATUS/TYPE	SIZE	LENGTH
ALPHA																		
A1	–	–	–	–	–	–	–	–	–	–	–	–	1	(E) DC6-48-60-18-8F	2 1	(E) DC (E) FIBER	13/16" 3/8"	105'-0"
A2	LTE/5G	(E) KATHREIN 800-10965	10°	55'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
A3	5G CBAND	(N) ERICSSON AIR6449 B77D+AIR6419 B77G STACKED	10°	56'-8" 53'-2"	–	INTERGRATED WITHIN	TOWER	–	–	–	–	–	–	–	–	–	–	–
A4	LTE/5G	(N) CCI TPA65R-BU6DA-K	10°	55'-0"	1 1 1 **2**	(E) 4449 B5/B12 (E) 8843 B2/B66A (E) RRUS-32 B30 **(N) Y CABLE**	TOWER	–	–	–	–	–	–	–	–	–	–	–
BETA																		
B1	–	–	–	–	–	–	–	–	–	–	–	–	1	(E) DC6-48-60-18-8F	2 1	(E) DC (E) FIBER	13/16" 3/8"	105'-0"
B2	LTE/5G	(E) KATHREIN 800-10965	120°	55'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
B3	5G CBAND	(N) ERICSSON AIR6449 B77D+AIR6419 B77G STACKED	120°	56'-8" 53'-2"	–	INTERGRATED WITHIN	TOWER	–	–	–	–	–	–	–	–	–	–	–
B4	LTE/5G	(N) CCI TPA65R-BU6DA-K	120°	55'-0"	1 1 1 **2**	(E) 4449 B5/B12 (E) 8843 B2/B66A (E) RRUS-32 B30 **(N) Y CABLE**	TOWER	–	–	–	–	–	–	–	–	–	–	–
GAMMA																		
C1	–	–	–	–	–	–	–	–	–	–	–	–	1	(E) DC6-48-60-0-8F	2	(E) DC	13/16"	105'-0"
C2	LTE/5G	(E) KATHREIN 800-10965	240°	55'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
C3	5G CBAND	(N) ERICSSON AIR6449 B77D+AIR6419 B77G STACKED	240°	56'-8" 53'-2"	–	INTERGRATED WITHIN	TOWER	–	–	–	–	–	–	–	–	–	–	–
C4	LTE/5G	(N) CCI TPA65R-BU6DA-K	240°	55'-0"	1 1 1 **2**	(E) 4449 B5/B12 (E) 8843 B2/B66A (E) RRUS-32 B30 **(N) Y CABLE**	TOWER	–	–	–	–	–	–	–	–	–	–	–
														UNUSED FEEDLINES:	6	COAX	7/8"	105'-0"

NOTE:
(E) – EXISTING
(N) – NEW

1 FINAL ANTENNA AND FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

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BU #: **842862**
EAST HAVEN SOUTH

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EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

ISSUED FOR:

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4	1/5/23	LR	CONSTRUCTION	LR

STATE OF CONNECTICUT
GRANT MITCHELL
No. 23024
LICENSED
PROFESSIONAL ENGINEER
1/5/23

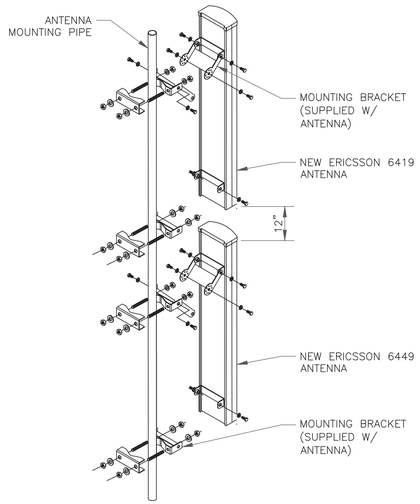
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: C-3

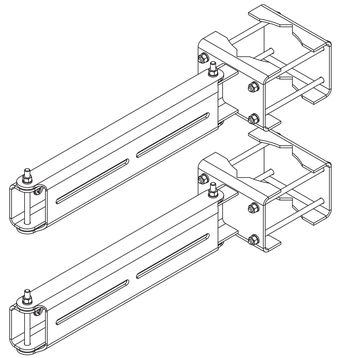
REVISION: 4

INSTALLER NOTES:

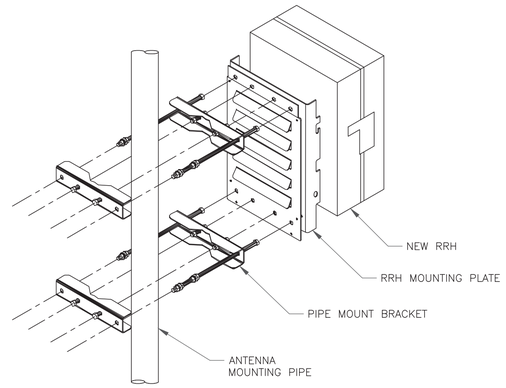
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



4 STACKED ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE



2 DUAL RADIO MOUNT
SCALE: NOT TO SCALE

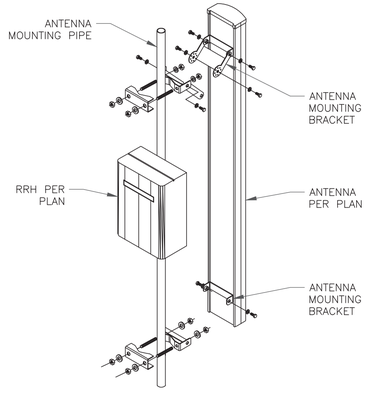


NOTE:
ANTENNA NOT SHOWN FOR CLARITY

3 SINGLE RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.
4. RRHs SHALL NOT BE INSTALLED CLOSER THAN 8" TO ANTENNAS.



4 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

INSTALLER NOTES:

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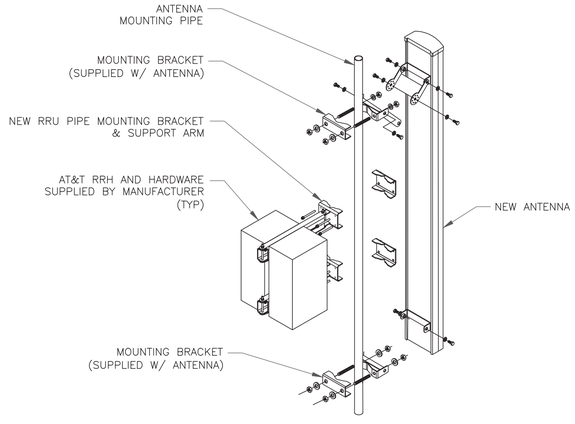
4. RRHs SHALL NOT BE INSTALLED CLOSER THAN 8" TO ANTENNAS.



5 ANTENNA WITH DUAL RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
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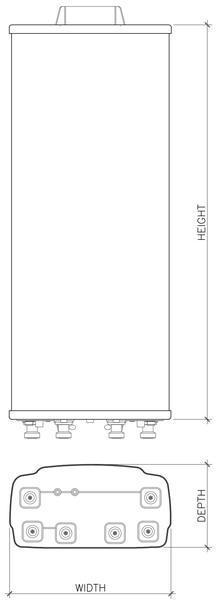
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/23

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

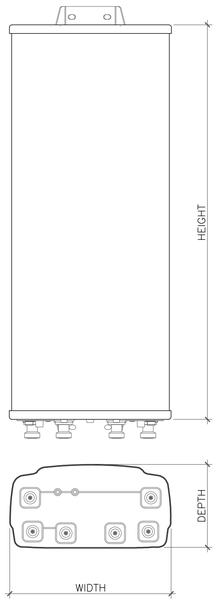
SHEET NUMBER: C-4

REVISION: 4



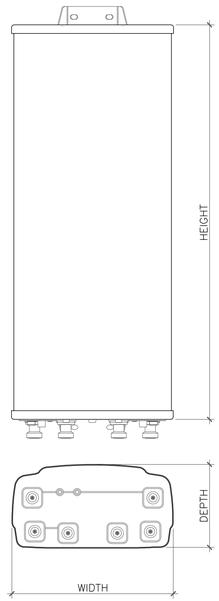
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR 6419 B77G	31.10"	16.10"	7.30"	44 lbs

1 ANTENNA DETAIL
SCALE: NOT TO SCALE



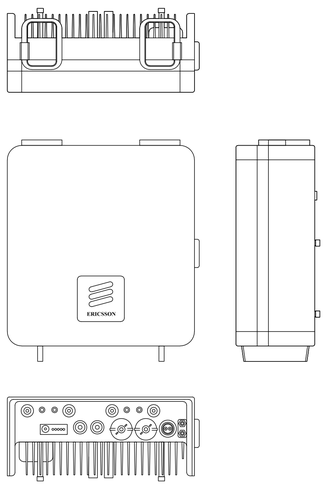
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR 6449 B77D	30.39"	15.87"	8.07"	81.60 lbs

2 ANTENNA DETAIL
SCALE: NOT TO SCALE



ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
TPA65R-BU6DA-K	71.20"	20.70"	7.70"	69 lbs

3 ANTENNA DETAIL
SCALE: NOT TO SCALE



ERICSSON – 4478 B14
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

4 ERICSSON – 4478 B14
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL05048

BU #: **842862**
EAST HAVEN SOUTH

259 COMMERCE STREET
EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

ISSUED FOR:

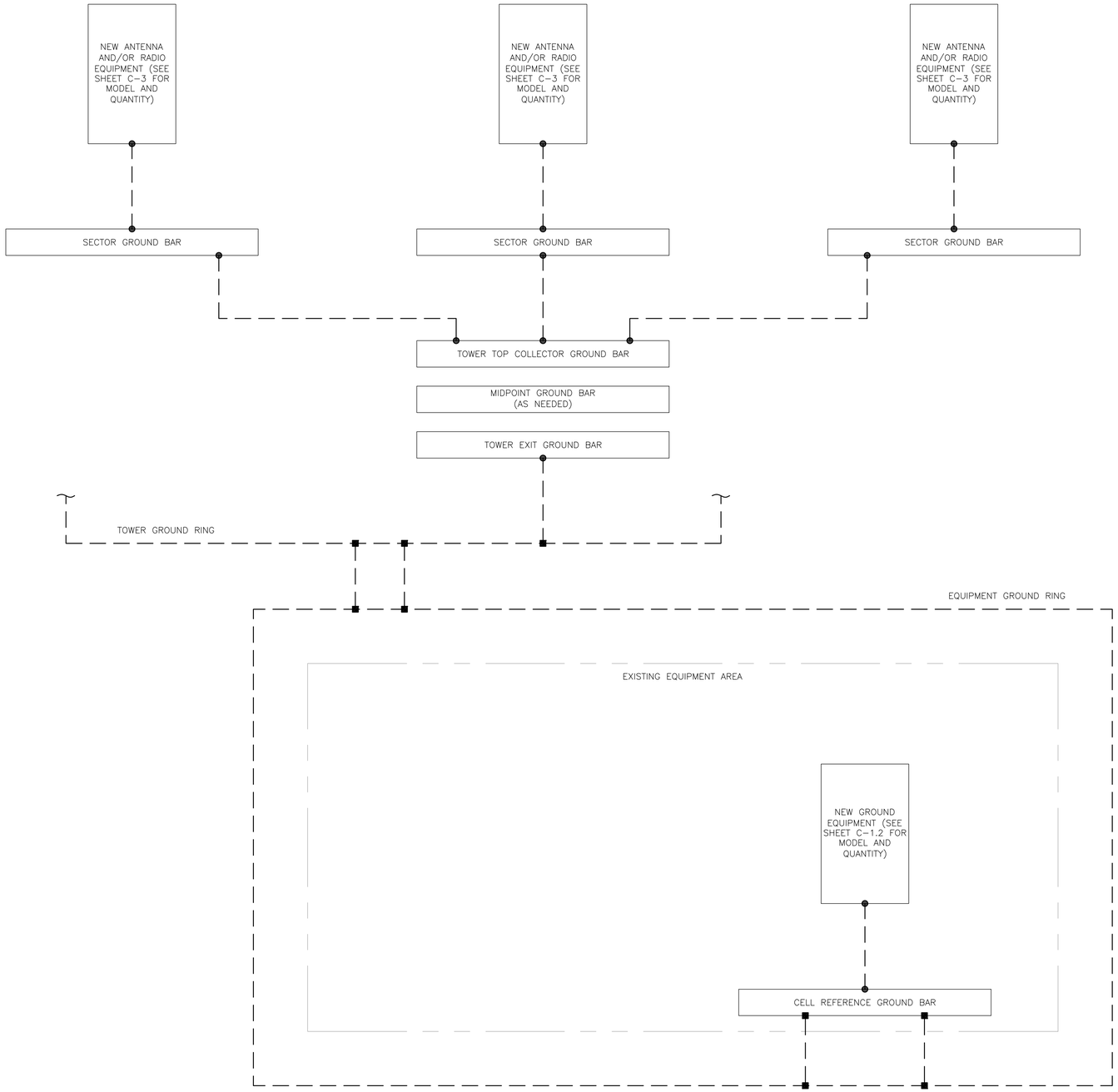
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	4/27/22	JTS	CONSTRUCTION	MTJ
1	7/19/22	JTS	CONSTRUCTION	MTJ
2	9/15/22	JTS	CONSTRUCTION	MTJ
3	9/26/22	JTS	CONSTRUCTION	MTJ
4	1/5/23	LR	CONSTRUCTION	LR

STATE OF CONNECTICUT
MICHAEL T. JANOSKO
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/5/23

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: C-5

REVISION: 4



1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

GROUNDING PLAN LEGEND:

- GROUND WIRE
- EXOTHERMIC WELD
- MECHANICAL CONNECTION
- COPPER GROUND ROD
- GROUND ROD W/ TEST WELL

CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUITS (ATT-TP-76416 7.6.7).

HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CELL SITE REFERENCE GROUND BAR MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS.

EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE (ATT-TP-76416 7.6.7.2).

DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

AT&T
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ATLANTA, GA 30324-3300

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AT&T SITE NUMBER:
CTL05048

BU #: **842862**
EAST HAVEN SOUTH

259 COMMERCE STREET
EAST HAVEN, CT 06512

EXISTING
58'-0" MONOPOLE

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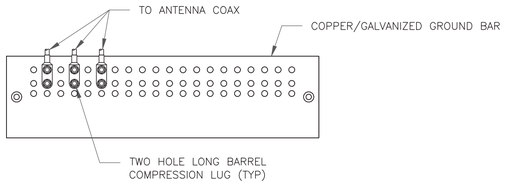
4	1/5/23	LR	CONSTRUCTION	LR

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/5/23

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: G-1

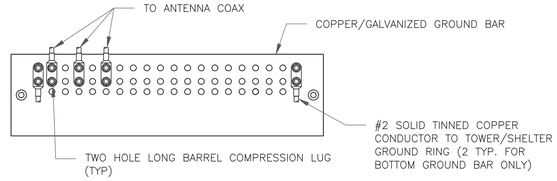
REVISION: 4



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

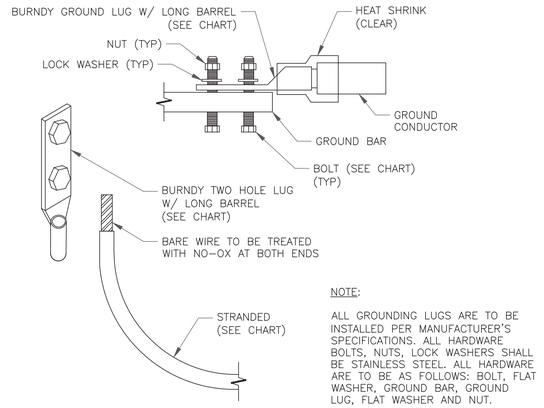


NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE

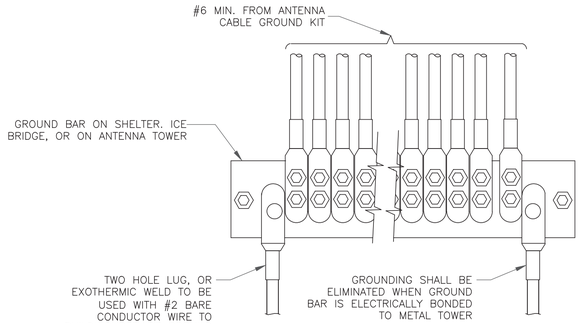
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



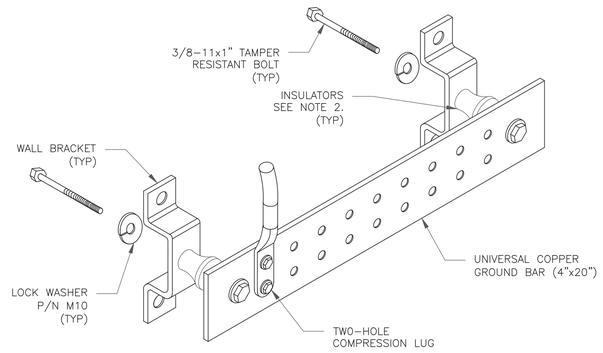
NOTE:

ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE

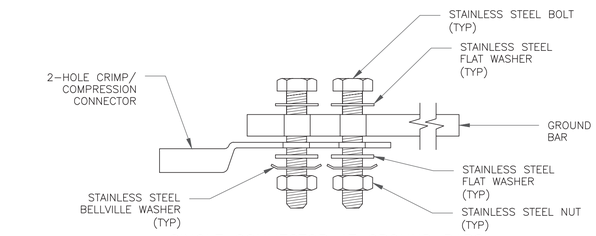


NOTES:

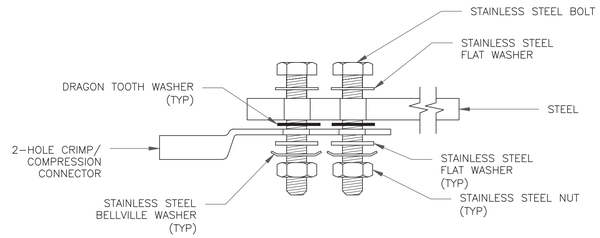
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

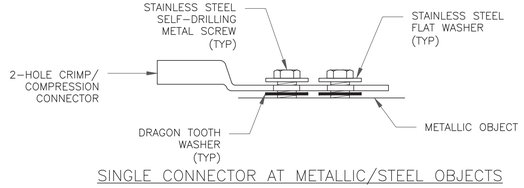
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

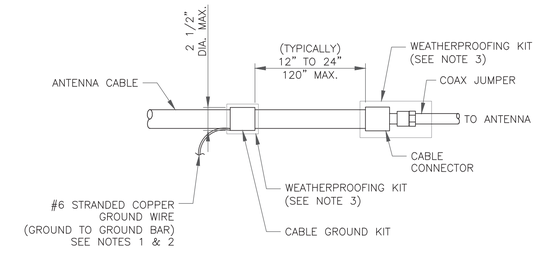


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

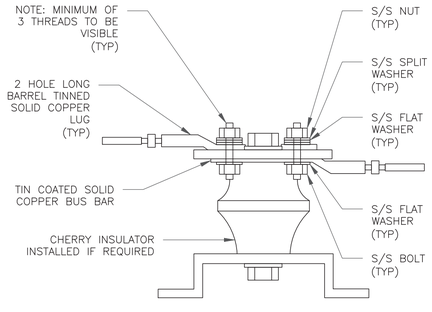
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

AT&T
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ATLANTA, GA 30324-3300

CROWN CASTLE
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EXISTING
58'-0" MONOPOLE

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3	9/26/22	JTS	CONSTRUCTION	MTJ
4	1/5/23	LR	CONSTRUCTION	LR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

SHEET NUMBER: G-2

REVISION: 4

Diagram - Sector	A	Diagram File Name - Cband_3Ant_B14_8Port_8843_2xDC6_1xDCSquid_1x5216+1xXMU+1x6630+6648_Rev.1.vsd					
Atoll Site Name -	CTL05048	Location Name -	EAST HAVEN SOUTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson"

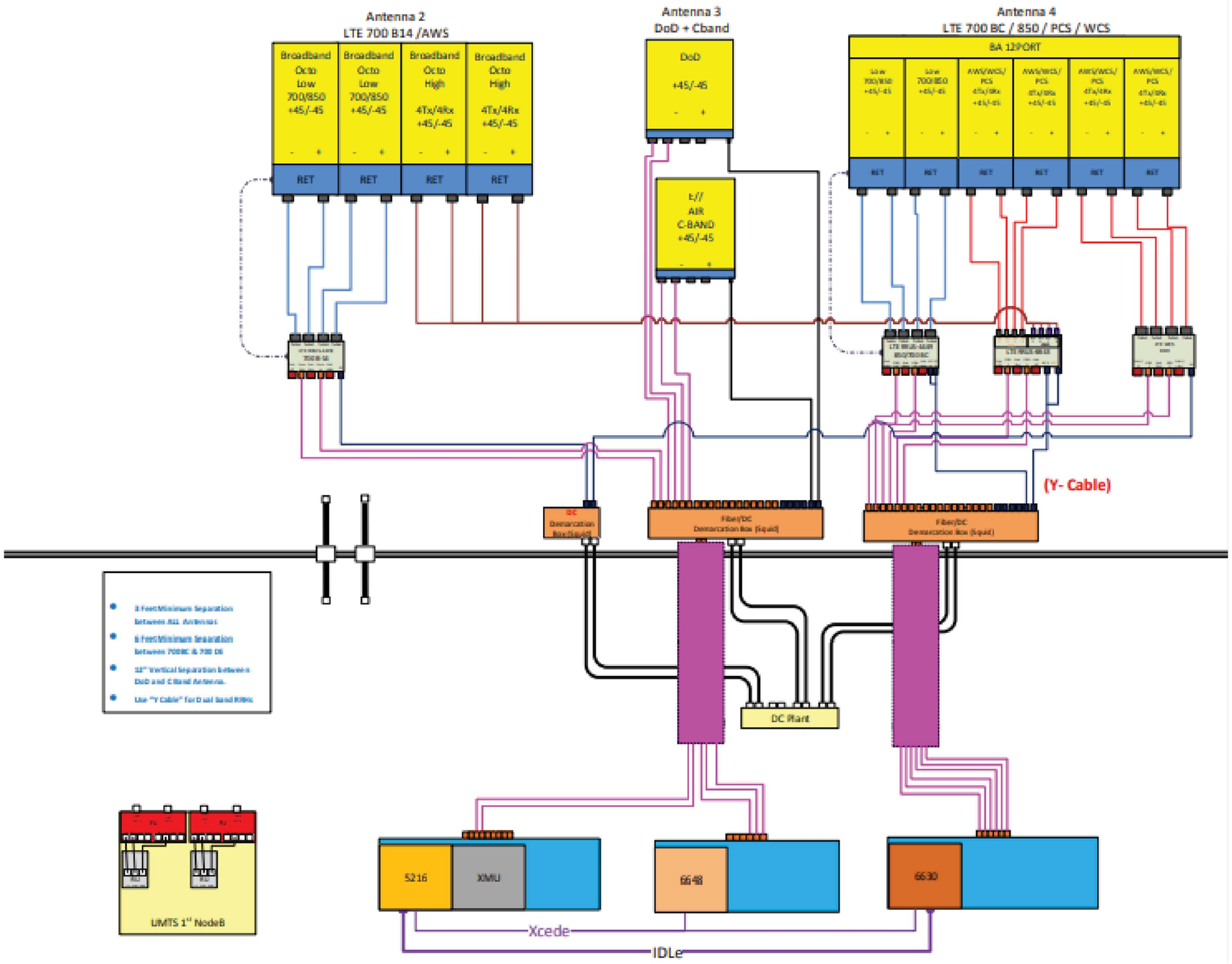


Diagram - Sector	B	Diagram File Name - Cband_3Ant_B14_8Port_8843_2xDC6_1xDCSquid_1x5216+1xXMU+1x6630+6648_Rev.1.vsd					
Atoll Site Name -	CTL05048	Location Name -	EAST HAVEN SOUTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson"

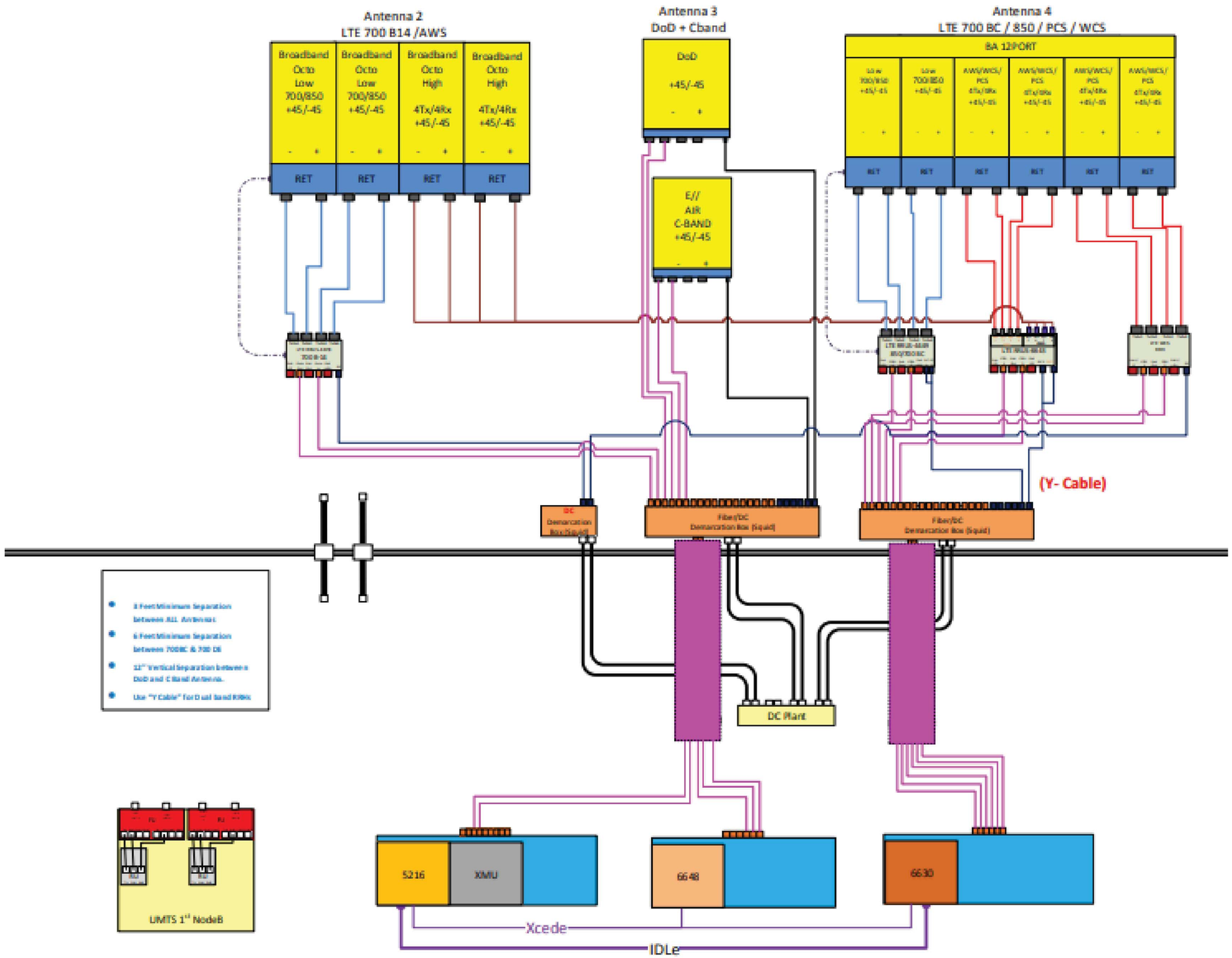
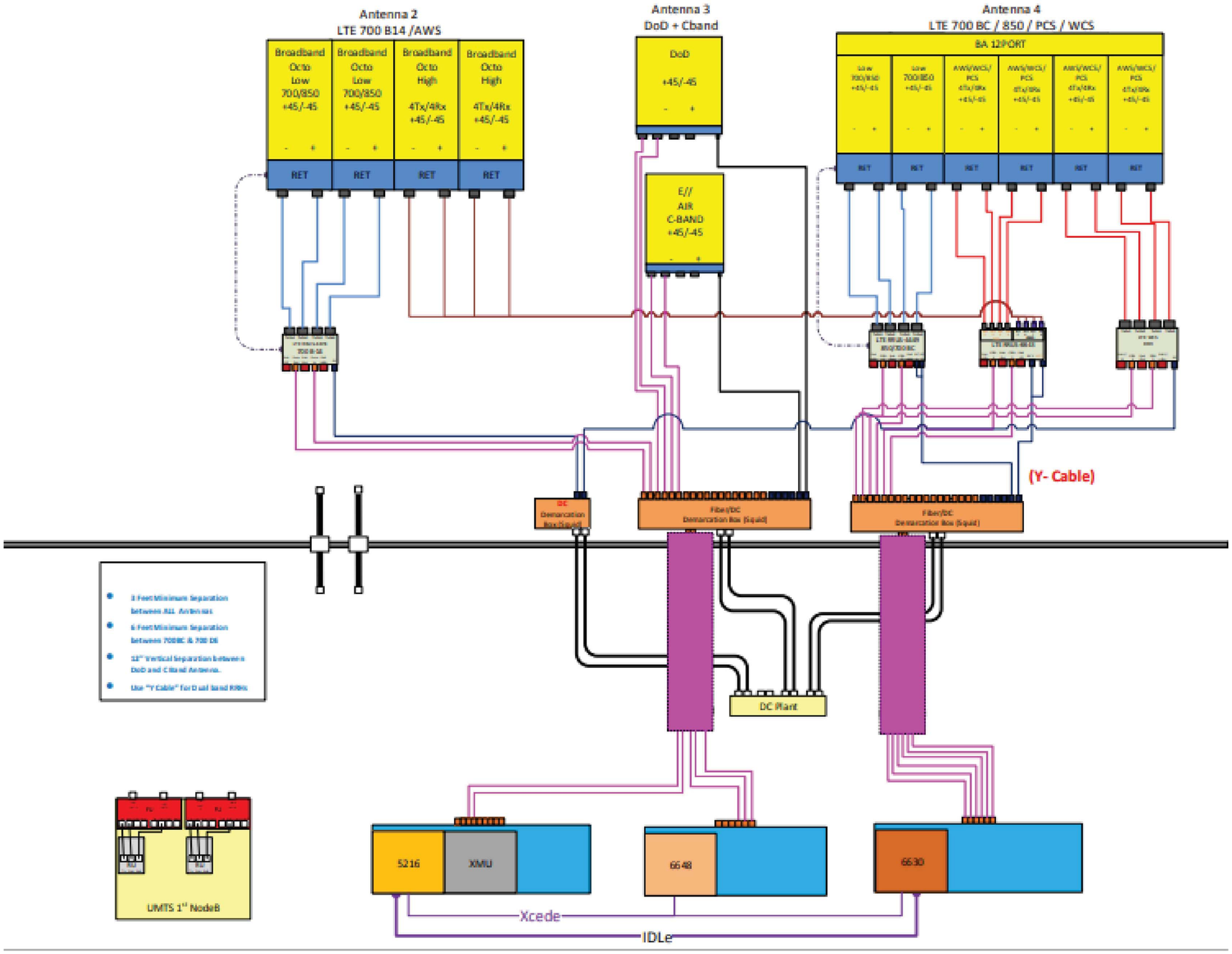
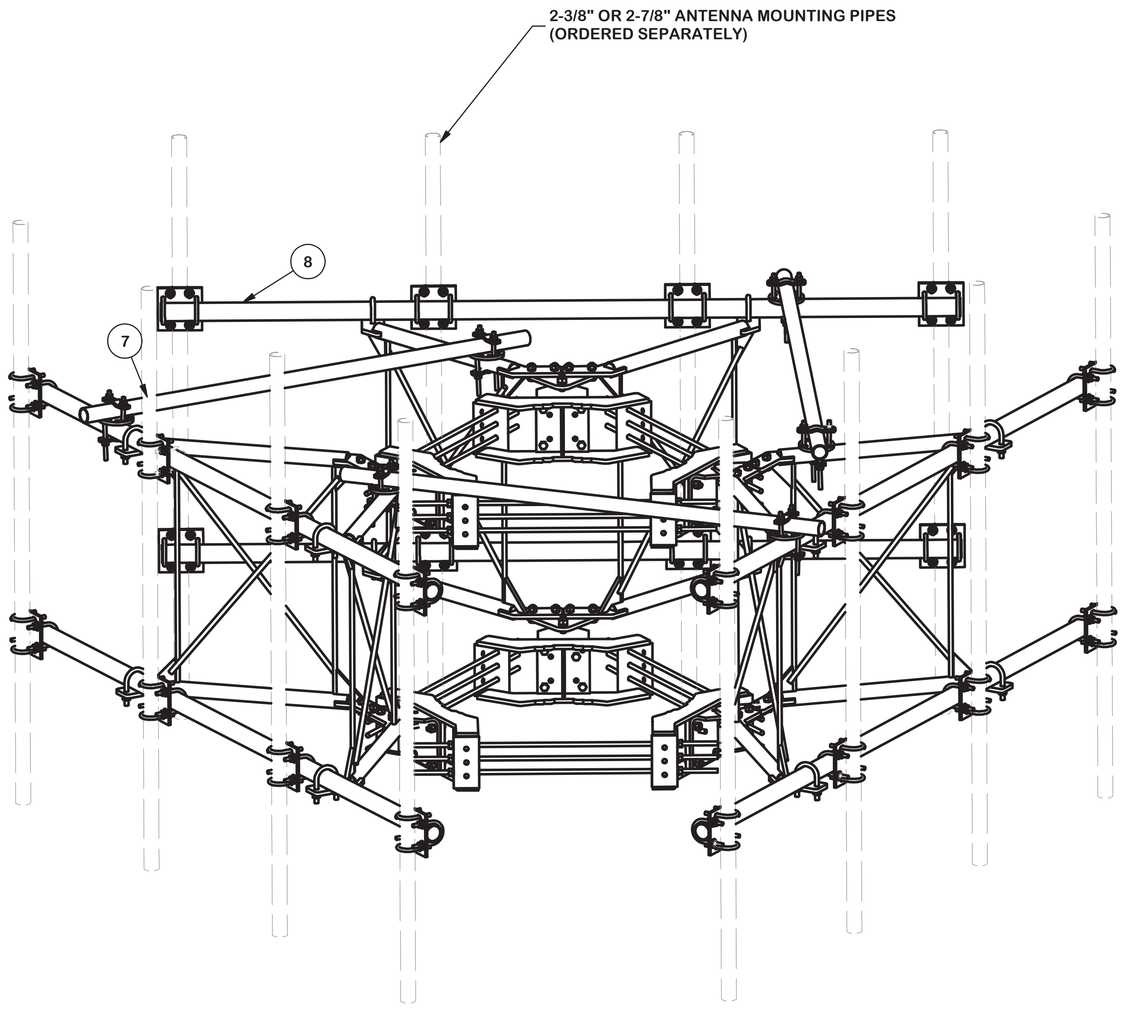


Diagram - Sector	C	Diagram File Name - Cband_3Ant_B14_8Port_8843_2xDC6_1xDCSquid_1x5216+1xXMU+1x6630+6648_Rev.1.vsd					
Atoll Site Name -	CTL05048	Location Name -	EAST HAVEN SOUTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson"							





PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-RMBPTC	RING MOUNT BENT PLATE TOP CONNECTION	13 in	14.80	44.41
3	3	X-RMBPBC	RING MOUNT BENT PLATE BOTTOM CONNECTION	12 in	14.80	44.41
4	6	X-VFAPL3	VFA-HD PIVOT PLATE	24 in	9.69	58.15
5	6	X-VFAW	SUPPORT ARM		66.80	400.78
6	24	SCX2	CROSSOVER PLATE	7 in	4.80	115.11
7	3	P284	2-3/8" X 84" SCH 40 GALVANIZED PIPE	84 in	26.91	80.74
8	6	P30126	2-7/8" O.D. X 126" SCH. 40 PIPE	126 in	76.94	461.62
9	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.48	14.90
10	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.91	10.95
11	6	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	2.87
12	6	G34LW	3/4" HDG LOCKWASHER		0.04	0.26
13	6	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	1.27
14	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	0.40	7.18
15	12	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	13.79
16	24	A582112	5/8" x 2-1/2" HDG A325 HEX BOLT	2 1/2 in	0.33	8.02
17	24	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	7.50
18	108	G58LW	5/8" HDG LOCKWASHER		0.03	2.82
19	108	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	14.03
20	48	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.26	12.34
21	96	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	70.91
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
23	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
24	216	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	7.36
25	216	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.00
26	216	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	15.47
					TOTAL WT. #	1904.67

ANT 15996

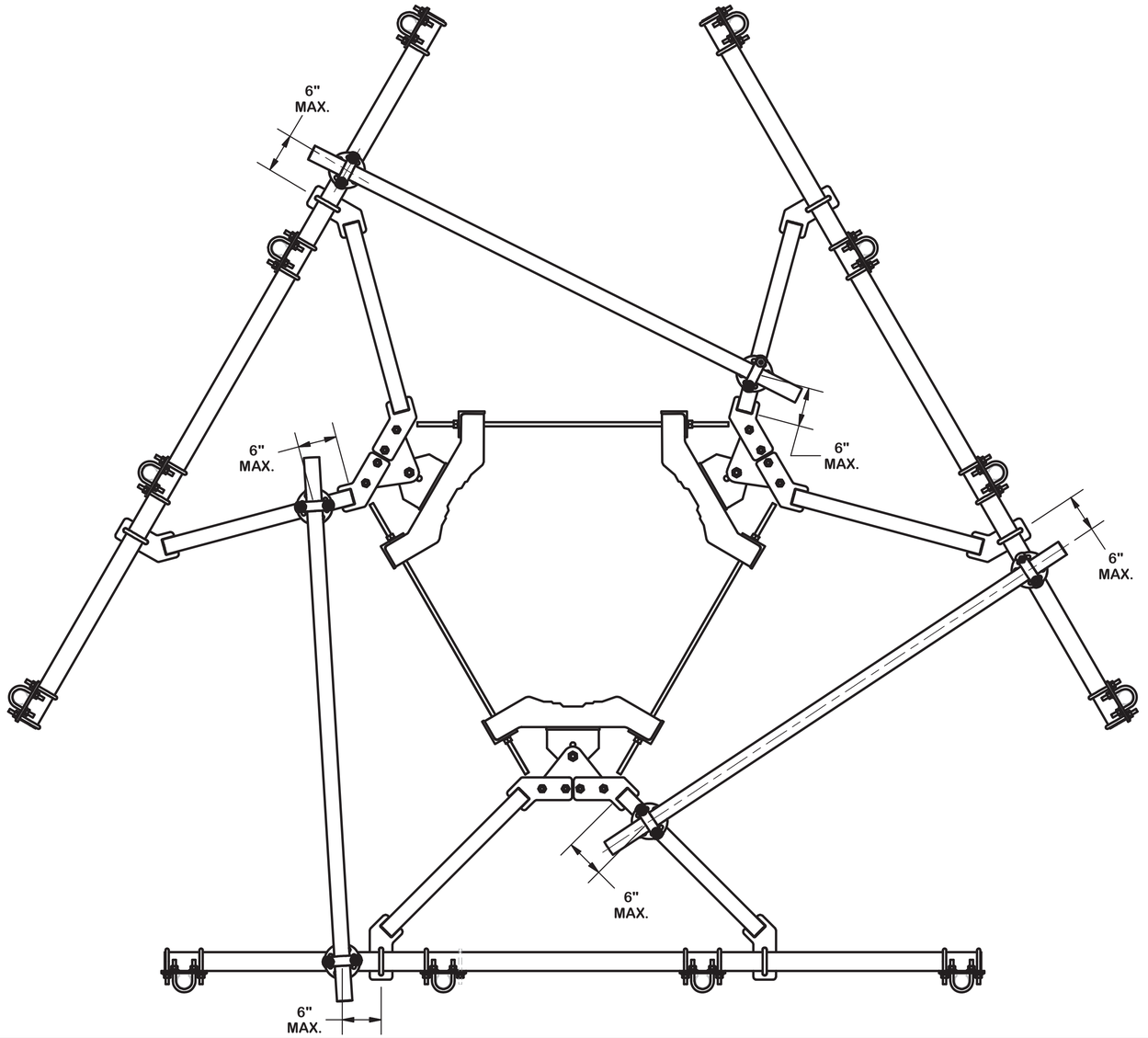
TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
THREE SECTOR HEAVY 10 FRAME
AND MONOPOLE ATTACHMENT HARDWARE
NO MOUNTING PIPES

SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.		DRAWN BY	ENG. APPROVAL	PART NO.	
		CEK 9/15/2016		VFA10-HD3L4NP	PAGE 1 OF 4
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP	



ANT 15996

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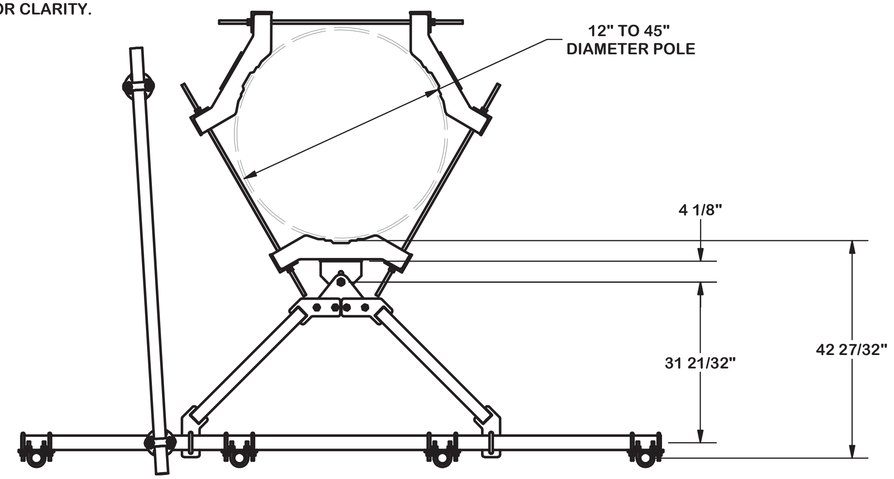
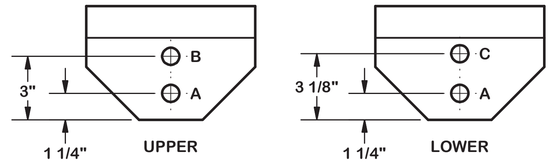
CPD NO.		DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
		CEK 9/15/2016		VFA10-HD3L4NP	2 OF 4
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP	

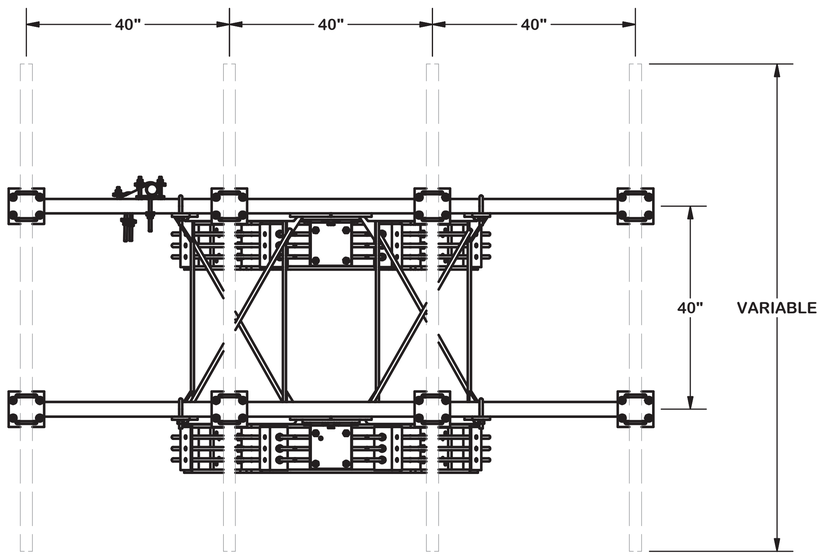
NOTE:
OTHER SECTORS REMOVED FOR CLARITY.

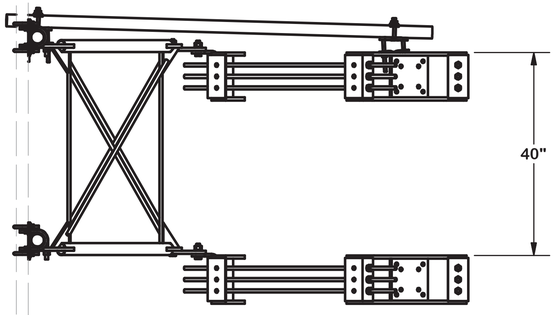




NOTES:

1. USE HOLE "A" IN UPPER AND LOWER BRACKETS FOR STRAIGHT LEGS.
2. USE HOLE "A" IN UPPER BRACKET AND HOLE "C" IN LOWER BRACKET FOR 3°.
3. USE HOLE "B" IN UPPER BRACKET AND HOLE "C" IN LOWER BRACKET FOR 0.2°.





ANT 15996

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LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
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Plymouth, IN
Salem, OR
Dallas, TX

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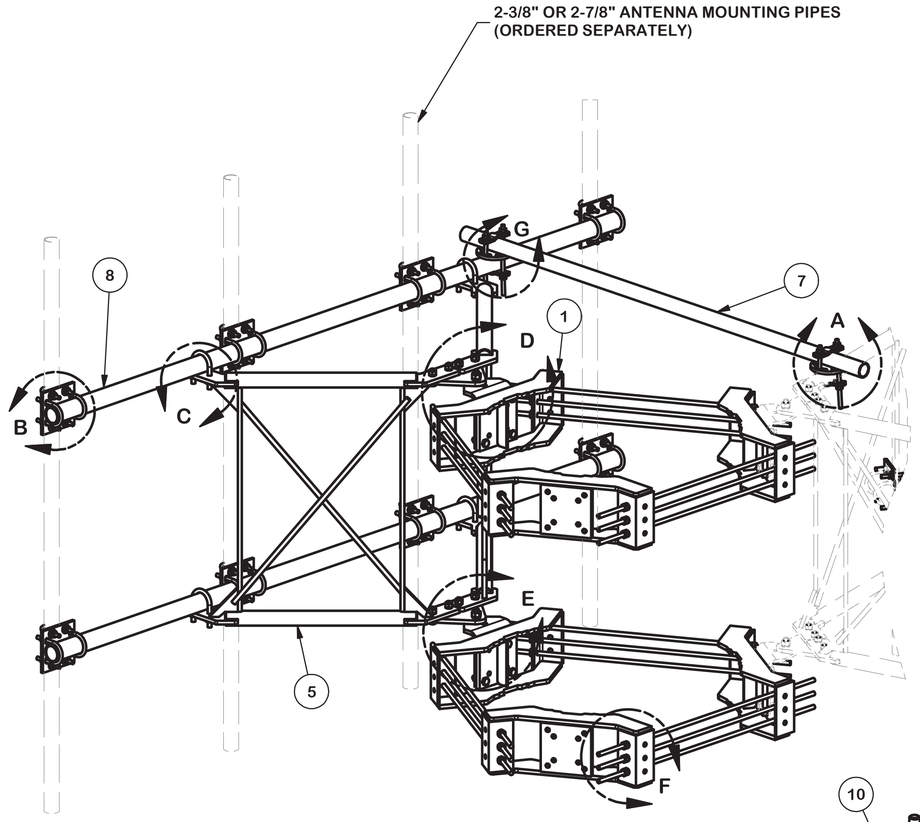
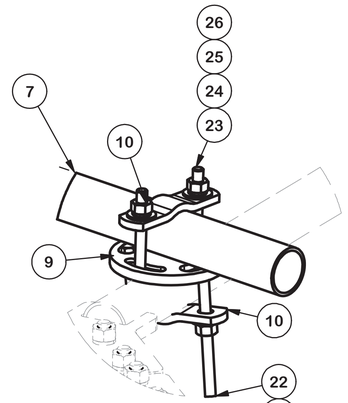
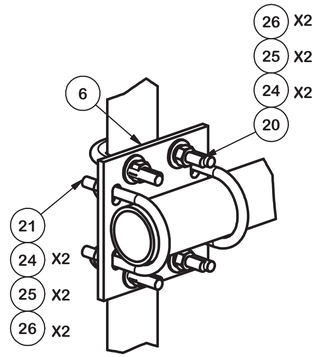
81	02	CUSTOMER	BMC 10/17/2016	VFA10-HD3L4NP

NOTE:
OTHER SECTORS REMOVED FOR CLARITY.





DETAIL A



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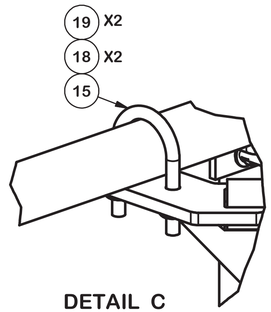

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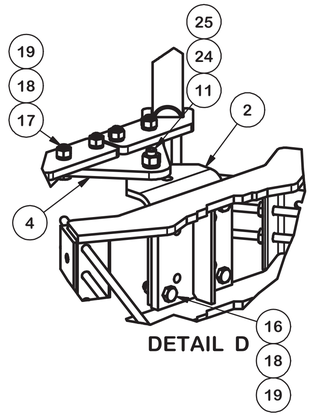

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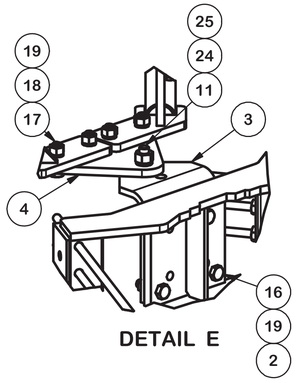

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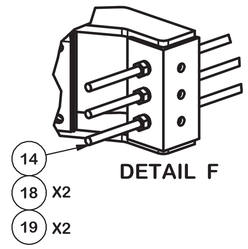
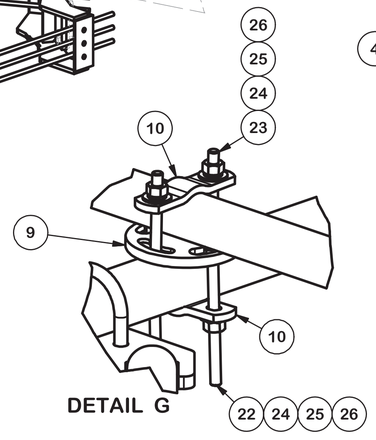


DETAIL F



DETAIL G

ANT 15996

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
THREE SECTOR HEAVY 10 FRAME
AND MONOPOLE ATTACHMENT HARDWARE
NO MOUNTING PIPES

SITE PRO 1
A valmont COMPANY
Engineering
Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

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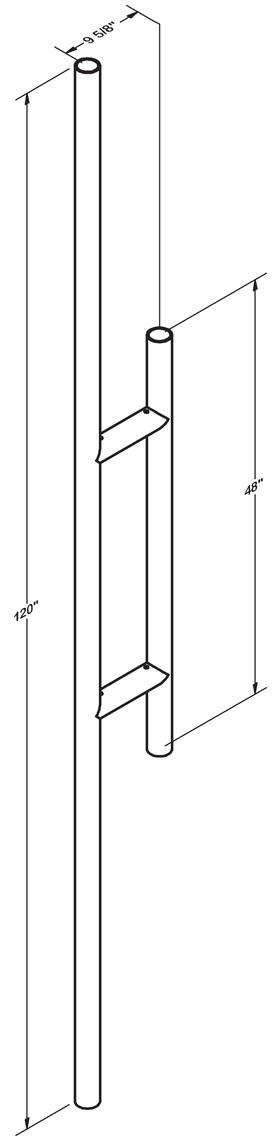

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-PM1	PM1 STANDOFF MOUNT WELDMENT		59.45	59.45

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	120" LONG PIPE WAS 70" LONG		KC8	4-28-21

REVISION HISTORY

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
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DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
1' PANEL
STAND-OFF MOUNT

SITE PRO 1
A valmont COMPANY

Engineering Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 8/9/2019		PM1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 8/21/2019	PM1